APPENDIX B
Standards and Guidelines

Standards and Guidelines

Congress passed the Taylor Grazing Act in 1934 to direct occupancy and use of public rangelands to preserve natural resources from destruction or unnecessary injury, provide for the orderly use, improvement, and development of rangelands. Since enactment of the Taylor Grazing Act, several studies and reports have identified problems on the western rangelands. The Public Rangelands Improvement Act (PRIA, 1978) identified that rangelands are producing below their potential, rangelands will remain in an unsatisfactory condition and some areas may decline further under present levels of funding, and these unsatisfactory conditions present a high risk of soil loss, water loss, loss of or threats to fish and wildlife habitat, loss of forage for livestock and grazing animals, and unpredictable and undesirable long term local and regional climatic and economic changes.

Resource conditions have improved since passage of PRIA, but many riparian areas continue to be degraded and are not functioning properly. The Director of the Bureau of Land Management requested the agency's National Public Lands Advisory Council to recommend ways to improve BLM's rangeland management program. In 1991, the Council commissioned a blue-ribbon panel of professional ecologists and rangeland managers who produced a report titled *Rangeland-Program Initiatives and Strategies*. Their report concluded that BLM's primary objectives should be to protect the basic components of rangelands; soil, water, and vegetation.

The BLM initiated a new effort, in 1993, commonly referred to as "Rangeland Reform 94." The focus of this effort is to enhance the environmental health of public rangelands. This effort was assisted with the publication of *Rangeland Health: New Methods to Classify, Inventory, and Monitor Rangelands*, 1994. The report was published by the Committee on Rangeland Classification, Board of Agriculture, of the National Research Council. The report explained criteria and indicators of rangeland health, assessment practices, and inventory and monitoring requirements.

The "Rangeland Reform" initiative culminated in a national environmental impact statement to provide grazing management direction to improve ecological conditions while providing for sustainable development on the land. In 1995, the Secretary of the Interior developed new grazing regulations to implement needed changes in BLM's rangeland management program.

Purpose and Need

The "Rangeland Reform 94" effort resulted in the publication of a final rule for Grazing Administration of public lands, on February 22, 1995, that became effective August 21, 1995. Under section 4108.2 of these regulations the BLM State Director is required to develop state or regional standards, and guidelines for grazing administration in consultation with BLM Resource Advisory Council (District Advisory Council), other agencies, and the public. The purpose of the standards, and guidelines is indicated from the following quotations from the Federal Register, Vol. 60, No. 35, page 9956, dated February 22, 1995:

The guiding principles for standards and guidelines require that State or regional standards and guidelines address the basic components of healthy rangelands.

The Department intends that the standards and guidelines will result in a balance of sustainable development and multiple use along with progress towards attaining healthy, properly functioning rangelands.

The Department believes that by implementing grazing-related actions that are consistent with the fundamentals of Subpart 4180.1 and the guiding principles of Subpart 4180.2, the long-term health of public rangelands can be ensured.

Fundamentals of Rangeland Health

In its report, the Committee for the National Research Council defined rangeland health as "...the degree to which the integrity of the soil and ecological processes of rangeland ecosystems are sustained, " and in particular those "ecological processes that are most important in sustaining the capacity of rangeland to satisfy values and produce commodities." The committee from the Council recommended "...the determination of whether a rangeland is healthy, at risk, or unhealthy should be based on the evaluation of three criteria: degree of soil stability and watershed function, integrity of nutrient cycles and energy flow, and presence of functioning recovery mechanisms" (Ibid). When the factors of a healthy rangeland site are met then values and commodities will be conserved. The "Rangeland Health Matrix" developed by the National Research Council can be found in Appendix XXX.

Under Title 43 of the Code of Federal Regulation, Section 4180 of the grazing regulations directs the authorized officer to ensure the following conditions of rangeland health exist:

(a) Watersheds are in or are making significant progress toward, properly functioning physical condition, including their upland, wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage, and the release of water that are in balance with climate and landform and maintain or improve water quality, water quantity, and the timing and duration of flow.

(b) Ecological processes, including the hydrologic cycle, nutrient cycle, and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.

(c) Water quality complies with State water quality standards and achieves, or is making significant progress toward achieving, established BLM management objectives such as meeting wildlife needs.

(d) Habitats are, or are making significant progress toward being, restored or maintained for Federal threatened and endangered species, Federal Proposed, Category 1 and 2 Federal Candidate and other special status species.

Items (a) and (b) prescribe physical and biological characteristics of rangeland health. Items (c) and (d) describe legal requirements that will be met when healthy rangelands are properly functioning.

Attributes for Standards and Guidelines

The fundamentals of rangeland health, guiding principles for standards and the fallback standards address ecological components that are affected by all uses of public rangelands, not just livestock grazing. However, the scope of this final rule, and therefore the fundamental of rangeland health of part 4180.1, and the standards and guidelines to be made effective under part 4180.2, are limited to grazing administration (Federal Register, Vol. 60, No. 35, pg. 9970-9971).

The following are characteristics of standards and guidelines.

Standard:

1. is criterion regarding a resource quality or quantity upon which a judgement or decision is based (e.g., a statement concerning expected ecosystem or rangeland health);
2. is measurable;
3. establishes parameters within which resources uses and management activities can be conducted;

and

4. should have observable indicators.

Guideline:

1. describes a practice, prescription, method or technique used to ensure that grazing management activities meet standards;
2. is either a set of management practices from which one or more practices is selected; or is a specific, required management practice;
3. could be adapted or changed when monitoring or other information indicates the guidelines are not effective or a better means of meeting applicable standard exists.

Standards and Guidelines- Constraints and Development

1. The standards for public land health apply to resource uses and activities undertaken on the public lands. The guidelines for livestock grazing apply only to livestock grazing management practices. Guidelines for activities other than livestock grazing are not proposed at this time; however, BLM intends to formulate additional guidelines in the future as opportunities present themselves.

2. The standards and the guidelines for livestock grazing are subject to the approval of the Secretary of Interior. Pending Secretarial approval, the National Fallback Standards and Guidelines apply.

3. The intent of the standards and guidelines is to ensure a balance of sustainable development and multiple use along with progress toward attaining healthy, properly functioning ecosystems.

4. The standards and applicable guidelines will be implemented through terms and conditions of permits, leases, and other authorizations or actions issued or undertaken in accordance with BLM's approved land use plans.

5. To the extent possible, implementation will be determined and applied through collaborative management approaches with other land owners, organizations, and agencies on a regional or watershed scale, or in relation to discreet land use plan units such as areas designated for OHV use as open, limited, or closed.

6. At a minimum, implementation will be coordinated and in consultation with the affected permitees/lessees, the appropriate state agency, tribe, and interested public.

7. BLM's grazing regulations require that "appropriate action" be taken when "existing grazing management practices or levels of grazing use..are significant factors in failing to achieve the standards and... guidelines." BLM will take corrective action as practicable for other management practices or uses not meeting the standards.

8. Some areas may require years to fully achieve the standards, due to natural factors such as climatic conditions, soils, presence of naturalized non-native plant species, and other related factors.

9. The values and demand for use of the public lands will continue to increase and be diverse.

10. BLM will not arbitrarily eliminate or unreasonably restrict an existing use otherwise allowable by law or regulation. In applying the standards and any applicable guidelines, BLM will emphasize a balanced approach to resource management, taking into account such factors as context and intensity of impacts; the opportunities for reclamation, restoration, or rehabilitation; and possible

mitigation including off-site mitigation.

Resource Advisory Council Direction

Under the February 22, 1995, rulemaking, the Secretary of the Interior called for the formation of Resource Advisory Councils (RACs) to advise the BLM about defining areas and the development of standards and guidelines for those areas. The RACs will advise the BLM concerning preparation, amendment, and implementation of land use plans. The existing California Desert District Advisory Council (DAC) will serve as the California Desert District's Resource Advisory Council. The rulemaking directs the State Director to coordinate with Indian tribes, the pubic, and affected State and Federal agencies during development of standards and guidelines.

The staffs in areas once defined as the Bakerfield, Ukiah, and Susanville Districts, coordinated on a state-wide planning effort called *Rangeland Health Standards and Guidelines for California and Northwestern Nevada, Environmental Impact Statement* to adopt regional standards for rangeland health and guidelines for grazing management on BLM-administered lands. The DAC chose not to initiate a new planning process for the express purpose of analyzing livestock standard and guidelines nor contribute staff to the statewide effort. The Council preferred instead to develop standards for all public land uses through several ongoing planning efforts. In addition, they felt it would be more efficient to address standards at the Planning Area level instead of desert-wide, and the CDCA Plan primarily conforms to the fundamentals of rangeland health. These planning efforts include the Western Mojave Coordinated Management Plan, Northern and Eastern Mojave Planning Effort, Coachella Valley Habitat Conservation Plan, Northern and Eastern Colorado Desert Coordinated Management Plan, and Plan Amendment for the South Coast Resource Management Plan and the Eastern San Diego Area Plan.

The DAC is actively involved in development of Standards for Public Land Health and Guidelines for Grazing Management. Early in the process a subcommittee was formed to develop a proposal for standards and guidelines. To date, the standards have been developed and are listed in Alternative 2. Upon completion of the Northern and Eastern Mojave Planning Effort the State Director will submit a set of standards and guidelines for approval by the Secretary of the Interior. Adoption of the regional standards will occur when the Secretary concurs. Until adoption of the regional standards, the fallback standards and guidelines or existing planning and activity plan guidance will be utilized, dependent upon which one more closely matches the fundamentals of rangeland health.

At a minimum State or regional guidelines must address the following:

1. maintain or promote adequate amounts of vegetative ground cover, including standing plant material and litter, to support infiltration, maintain soil moisture storage, and stabilize soils;
2. maintain or promote subsurface soil conditions that support permeability rates, appropriate to climate and soils;
3. Maintain, improve or restore riparian-wetland functions including energy dissipation, sediment capture, groundwater recharge and stream bank stability;
4. Maintain or promote stream channel morphology (e.g. gradient width/depth ratio, channel roughness and sinuosity) and functions appropriate to climate and landform;Maintain or promote the appropriate kinds and amounts of organisms, plants and animals to support the hydrologic cycle, nutrient cycle, and energy flow;
5. Promote the opportunity for seedling establishment of appropriate plant species when climate conditions and space allow;
6. Maintain, restore or enhance water quality to meet management objectives, such as meeting wildlife needs;
7. Restore, maintain or enhance habitats to assist in the recovery of Federal threatened or endangered species;

8. Restore, maintain or enhance habitats of Federal Proposed, Category 1 and 2 Federal candidate, and other special status species to promote their conservation;
9. Maintain or promote the physical and biological conditions to sustain native populations and communities;
10. Emphasize native species in the support of ecological function; andIncorporate the use of non-native plant species only in those situations in which native species are not available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions and biological health;
11. Emphasize native species in the support of ecological function; and
12. Incorporate the use of non-native plant species only in those situations in which native species are not available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions and biological health.

REGIONAL STANDARDS 1/ For PUBLIC LAND HEALTH
Recommended by The
California Desert District Advisory Council

Soils:
Soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, geology, landform, and past uses. Adequate infiltration and permeability of soils allow accumulation of soil moisture necessary for optimal plant growth and vigor, and provide a stable watershed.

As indicated by:

- Canopy and ground cover are appropriate for the site;
- There is diversity of plant species with a variety of root depths;
- Litter and soil organic matter are present at suitable sites;
- Maintain the presence of microbiotic soil crusts that are in place;
- Evidence of wind or water erosion does not exceed natural rates for the site; and
- Hydrologic and nutrient functions maintained by permeability of soil and water infiltration are appropriate for precipitation.

Native Species:
Healthy, productive and diverse habitats for native species, including special status species (Federal T&E, Federal proposed, Federal candidates, BLM sensitive, or California State T&E, and CDD UPAs) are maintained in places of natural occurrence.

As indicated by:

- Photosynthetic and ecological processes continue at levels suitable for the site, season, and precipitation regimes;
- Plant vigor, nutrient cycle, and energy flow are maintaining desirable plants and ensuring reproduction and recruitment;
- Plant communities are producing litter within acceptable limits;
- Age class distribution of plants and animals are sufficient to overcome mortality fluctuations;
- Distribution and cover of plant species and their habitats allow for reproduction and recovery from localized catastrophic events;
- Alien and noxious plants and wildlife do not exceed acceptable levels;
- Appropriate natural disturbances are evident; and
- Populations and their habitats are sufficiently distributed to prevent the need for listing special status species.

Riparian/Wetland and Stream Function:
Wetland systems associated with subsurface, running, and standing water, function properly and have the ability to recover from major disturbances. Hydrologic conditions are maintained.

As indicated by:

Vegetative cover will adequately protect banks, and dissipate energy during peak water flows;

- Dominant vegetation is an appropriate mixture of vigorous riparian species;
- Recruitment of preferred species is adequate to sustain the plant community;
- Stable soils store and release water slowly;
- Plant species present indicate soil moisture characteristics are being maintained;
- There is minimal cover of invader/shallow-rooted species, and they are not displacing deep-rooted native species;
- Maintain shading of stream courses and water sources for riparian dependent species;
- Stream is in balance with water and sediment being supplied by the watershed;
- Stream channel size and meander is appropriate for soils, geology, and landscape; and
- Adequate organic matter (litter and standing dead plant material) is present to protect the site and to replenish soil nutrients through decomposition.

Water Quality:
Water quality will meet State and Federal standards including exemptions allowable by law.

As indicated by:

- Dissolved oxygen levels, aquatic organisms and plants (e.g., macro invertebrates, fish and algae) indicate support of beneficial uses;
- Chemical constituents, water temperature, nutrient loads, fecal coliform and turbidity are appropriate for the site or source; and
- Best Management Practices will be implemented.
-

Air Quality:
Air quality will meet State and Federal standards including exemptions allowable by law.

- Best Management Practices will be implemented.

Note: 1/ Past and current assessments are an integral part of evaluating these standards.

REGIONAL GUIDELINES For GRAZING MANAGEMENT
Recommended by The
California Desert District Advisory Council

Resource conditions of each allotment will be routinely assessed to determine if Public Land Health Standards are being met. In those areas not meeting a Standard, monitoring processes will be established if they do not presently exist to monitor indicators of health until the Standard or resource objective has been attained. Activity plans for other uses or resources that overlap an allotment could have prescribed resource objectives that may further constrain grazing activities, e.g., ACEC. In an area where a Standard has not been met, the results of monitoring the modification or implementation of grazing management actions will be reviewed annually. During the final phase of the assessment process, the Determination will schedule the next assessment of resource conditions. Livestock trailing network, grazed plants, livestock facilities, and animal waste are expected impacts in all grazing allotments and will be considered during analysis of the assessment/monitoring process. To attain Standards and resource objectives, the best available science will be used to determine appropriate grazing management actions. Cooperative funding and assistance from other agencies, individuals, and groups will be sought to collect prescribed monitoring data for indicators of each Standard.

- Facilities are to be located away from riparian-wetland areas wherever they conflict with achieving or maintaining riparian-wetland functions.

- The development of springs and seeps or other projects affecting water and associated resources will be designed to protect the ecological functions and processes of those sites.

- Grazing activities at an existing range improvement that conflict with achieving proper functioning conditions (PFC) and resource objectives for wetland systems (lentic, lotic, springs, addits, and seeps) will be modified so PFC and resource objectives can be met, and incompatible projects will be modified to bring into compliance. The BLM will consult, cooperate, and coordinate with affected interests and livestock producer(s) prior to authorizing modification of existing projects and initiation of new projects. New range improvement facilities are to be located away from wetland systems if they conflict with achieving or maintaining PFC and resource objectives.

- Supplements will be located well away from wetland systems.

- Management practices will maintain or promote perennial stream channel morphology (e.g., gradient, width/depth ratio, channel roughness, and sinuosity) and functions that are appropriate to climate and landform.

- Grazing management practices are to meet State and Federal water quality standards. Where impoundments (stock ponds) and troughs that have a sustained discharge yield of less than 200 gallons per day to surface or groundwater are excepted from meeting State drinking water standards per SWRCB Resolution Number 88-63.

- In the California Desert Conservation Area all wildfires in grazing allotments will be suppressed. However, to restore degraded habitats infested with invasive weeds (e.g., tamarisk) prescribed burning may be utilized as a tool for restoration on a case by case basis. Prescribed burns may be used as a management tool for chaparral plant communities in the South Coast Region, where fire is a natural part of the regime.

- When climatic conditions and space allow, seedling establishment of native species will be

promoted.

- Grazing on designated ephemeral (annual and perennial) rangeland is allowed to occur only if reliable estimates of production have been made, an identified level of annual growth or residue to remain on site at the end of the grazing season has been established, and adverse effects on perennial species are avoided.

- During prolonged drought, range stocking will be reduced to scientifically based carrying capacity, based on climatic conditions. Livestock utilization of key perennial species on year-long allotments will be checked about March 1 when the Palmer Severity Drought Index/Standardized Precipitation Index indicates dry conditions are expected to continue.

- Through the assessment process or monitoring efforts, the extent of invasive and/or exotic plants and animals will be recorded and evaluated for future control measures. Methods and prescriptions will be implemented, and an evaluation will be completed to ascertain future control measures.

- Restore, maintain or enhance habitats to assist in the recovery of Federally listed threatened and endangered species. Restore, maintain or enhance habitats of special status species including Federal proposed, Federal candidates, BLM sensitive, or California State T&E to promote their conservation.

- Grazing activities will support biological diversity across the landscape, and native species and microbiotic crusts are to be maintained.

- Experimental and research efforts will be encouraged to provide answers to grazing management and related resource concerns through cooperative and collaborative efforts with outside agencies, groups, and entities.
- Based on Holechek's (et al., 1998) work or the best available scientific information, livestock utilization level of key perennial species of the Mojave Desert (range type) will not exceed 40 percent on ranges that are grazed during the dormant season and are meeting standards. Rangelands that are grazed during the active growing season and are meeting standards will not exceed 25 percent utilization of key species. The utilization range between 25 and 40 percent is for those forage species with a proper use factor that will allow consumption up to and between 25 and 40 percent otherwise lower use limits will prevail. Until modified with new information, utilization of the following general range types will be prescribed for grazing use.

Utilization Guidelines for Different Range Types in the CDD (adapted from Holechek et al. and Holechek 1991)				
Average Annual Precipitation		**Percent Use of Key Species for Moderate Grazing[1]**	**Range Types (1)**	**Reference**
cm.	**in.**			
10-13	4-8	25-35	Salt desert shrub land	Hutchings and Stewart 1953; Cook and Child 1971
13-30	8-12	30-40	Semidesert grass and shrubland	Valentine 1970; Paulsen and Ares 1961; Martin and Cable 1974; Holechek 1991
13-30	8-12	30-40	Sagebrush grassland	Pechanec and Stewart 1949; Laycock and Conrad 1981
25-100	10-40	50-60	California annual grassland	Hooper and Heady 1970; Bartolome et al. 1980; Rosiere 1987
40-130	16-50	30-40	Mountain shrub land	Pickford and Reid 1948; Skovlin et al. 1976
40-130	16-50	30-40	Oak woodland	Pieper 1970
25-45	9-16	30-40	Pinyon-juniper woodland	Pieper 1970

A. Rangelands in good condition and/or grazed during the dormant season can withstand the higher utilization level. Those in poor condition or grazed during active growth should receive the lower utilization.

Appendix C

Grazing Lease Terms and Conditions From Current Biological Opinions

Mitigation Measures for Sheep Grazing Activities in Desert Tortoise Habitat

1. Turnout of sheep shall not occur until production of 200 pounds air dry weight (ADW) per acre of ephemeral forage is available. The lessee shall remove sheep from an area of use or the entire allotment if ephemeral forage production falls below 200 pounds ADW per acre.

2. No grazing is authorized except as approved through grazing application. All herders shall have a copy of the current use authorization in their possession and a copy posted at the herder's camp site. When sheep are trailed outside of the allotment, all herders are required to have a copy of the trailing authorization in their possession.

3. A band of sheep is limited to no larger than 1,000 adult sheep with an approximately equal number of lambs.

4. Sheep are to be widely scattered or in a loose pattern when grazing through an area, and grazing sheep are to move through an area only once during the grazing season.

5. Sites where sheep are bedded and watered shall be change daily. Bedding or watering sites are to be at least ¼ mile from any previous site. Sheep are to be watered on or adjacent to existing dirt roads (within 25 feet) or existing disturbed or open areas cleared of shrubs from past uses.

6. Stopping and parking of vehicles, and vehicular camping along routes of travel is limited to within 50 feet of all routes, except in OHV open areas, in multiple-use Class "L" and "M" as described in the California Desert Conservation Area Plan.

7. A herder's camp site or camp trailer shall not remain in the same location for more than seven days. Establishment of a camp shall be at least one mile from any previous camp location. To eliminate or reduce scavenging of trash by desert tortoise predators, trash and garbage shall be removed from each camp site each day and no trash or garbage shall be buried at the camp site. All sheep carcasses within 300 feet of a road shall be removed. Sheep carcasses are to be removed from anywhere in OHV open areas, and permission from the authorized officer is required to remove dead sheep within a wilderness.

8. Within 15 days of the close of the authorized grazing period, the lessee shall submit to the field office a BLM-supplied map to delineate areas of daily grazing use within the allotment.

Mitigation Measures for Cattle Grazing Activities in Desert Tortoise Habitat

1. Utilization of key perennial forage species shall not be exceed 40 percent from February 15 to October 14 in the Lazy Daisy Allotment. No averaging of utilization data among perennial key forage species or key areas shall occur. When utilization approaches authorized limits in any key area, steps shall be taken to redistribute or reduce cattle use for that key area. Grazing use shall be curtailed to protect perennial plants during severe or prolonged drought. These steps may

include removal of cattle or, where feasible, turning off water at troughs to reduce adjacent grazing use.

2. Cattle shall be evenly dispersed throughout their area of use, and herding shall be limited to shipping and animal husbandry practices. Grazing use shall be managed according to grazing regulations, allotment management plans, CDCA Plan, and current biological opinions. Grazing use will be managed to improve trends for native perennial and annual plants where site potential permits. Galleta grass shall be a key forage species wherever it is found. Feeding of roughage, such as hay, hay cubes, or grains to supplement forage quantity, is not allowed.

3. All cattle carcasses found within 300 feet of any road shall be removed and disposed of in an appropriate manner, and no prior notification to the BLM is necessary if off-road vehicle use is required, but permission from the authorized officer is required to remove animals within wilderness.

4. Temporary, non-renewable (TNR) perennial forage above the "active" grazing use shall be authorized for one-month increments from March 1 to June 1 in Category I desert tortoise habitat. Outside of this period and in Category III habitat, TNR forage shall be authorized for three-month increments.

5. In Category I habitat, authorization of ephemeral forage shall occur when ephemeral forage production is at least 350 pounds ADW per acre. Authorization for ephemeral forage in Category III desert tortoise habitat shall occur when 200 pounds ADW per acre or more of ephemeral forage per acre is available. Any replacement cattle authorized to use ephemeral forage shall be removed from such allotments whenever the thresholds for curtailing ephemeral grazing are reached.

6. Nine Mile Canyon Well in the Lazy Daisy Allotment shall be developed to draw cattle away from Category I habitat. Construction and maintenance of range improvements in Category I and III habitat are limited to existing and proposed facilities listed in Appendices XX and XXX. For all construction, operation, and maintenance of range improvements involving land disturbance in desert tortoise habitat the requirements apply:

   A. Surface disturbance during construction of range improvements shall occur on previously disturbed sites and shall be minimized whenever possible. Routine vehicle use shall be limited to existing roads and disturbed areas, and off-road vehicle activity shall be held to a minimum. Construction of new roads shall be minimized. Construction of new or replacement facilities shall be carried out only from October 15 to March 15, unless specifically authorized due to safety or emergency considerations. After completion of the project, the disturbed soil shall be blended and contoured into the surrounding soil surface. To reduce attraction of desert tortoise predators, debris and trash created during construction or maintenance of a facility will be removed immediately.

   B. Range improvement construction, operation, and maintenance shall be modified as necessary to avoid direct impacts to desert tortoises and their burrows e.g., construction of fences or pipelines near tortoise burrows shall be avoided. Existing access and areas of disturbance shall be utilized when trenching a section of new pipe or during performance of maintenance. Any hazards to desert tortoises that may created, such as auger holes and trenches, shall be monitored by biological monitor at least twice daily for desert tortoises that become trapped. These hazards will be eliminated before workers leave the site.

   C. Prior to land-disturbing activities, a field contact representative (FCR) will be designated to ensure compliance with protective measures stipulations for the desert tortoise and will be responsible for coordinating with the Service. A FCR will have the authority and

responsibility to halt activities in violation of the Service stipulations.

D. Only authorized personnel are permitted to handle desert tortoises. If construction or maintenance of a range improvements endangers the life of a desert tortoise then authorized persons may move the animal a short distance away or hold the animal overnight to release it in the same area the next day.

E. All construction and maintenance workers shall strictly limit their activities and vehicles to areas flagged or cleared by persons authorized by the Service. When off-road use with equipment is required, the lessee is to notify the BLM two working days prior to construction or maintenance of a facility.

APPENDIX D
Northern and Eastern Colorado Desert Planning Area
Desert Tortoise Mitigation Measures

INTRODUCTION

These measures are intended to minimize the impacts of authorized actions or projects on desert tortoise and its habitat. In various wordings, they have been included in biological opinions issued by USFWS and in land-use decisions of BLM and others on Federal lands. Livestock grazing mitigation measures have not been reiterated due to their length and because they have been previously applied to the four allotments.

GENERAL MITIGATION MEASURES

1. Designated Persons

In the following measures, a "Qualified Biologist" is defined as a person with appropriate education, training, and experience to conduct tortoise surveys, monitor project activities, provide worker education programs, and supervise or perform other implementing actions. The person must demonstrate an acceptable knowledge of tortoise biology, mitigation techniques, habitat requirements, sign identification techniques, and survey procedures. Evidence of such knowledge may include work as a compliance monitor on a project in desert tortoise habitat, work on desert tortoise trend plot or transect surveys, or other research or field work on desert tortoise. Attendance at a training course endorsed by the agencies (e.g., Desert Tortoise Council tortoise training workshop) is a supporting qualification.

An "Authorized Biologist" is defined as a wildlife biologist who has been authorized to handle desert tortoises by USFWS and CDFG for this project. Name(s) of proposed Authorized Biologist(s) must be submitted to USFWS and CDFG for approval at least 15 days prior to anticipated need. The tortoise handling protocol is described in Attachment II.

A "Field Contact Representative" (FCR) is defined as a person designated by the project proponent who is responsible for overseeing compliance with desert tortoise protective measures and for coordination with the agency compliance officer. The FCR must be on-site during all project activities. The FCR shall have the authority to halt all project activities that are in violation of these measures. The FCR shall have a copy of all tortoise protective measures when work is being conducted on the site. The FCR may be an agent for the company, the site manager, any other project employee, a biological monitor, or other contracted biologist."

2. Worker Training

All workers, including all participating agency employees, construction and maintenance personnel, and others who implement authorized actions shall be given special instruction. this instruction will include training on distribution, general behavior and ecology, protection afforded by State and Federal endangered species acts (including prohibitions and penalties), and procedures for reporting encounters, and the importance of following the protection measures. The education program may consist of a class or video presented by a Qualified Biologist. It is recommended that workers carry wallet cards with important information while in the field.

3. Compliance

The FCR shall oversee compliance and coordination with the authorizing agency. Compliance shall include conducting species surveys, proper removal of species from areas being impacted, assurance that a sufficient number of Qualified Biologists are present during surface disturbance, and that all conditions of the authorization are being met by proponent, contractors, and workers. The FCR shall have the authority to halt activities that are in not in compliance with the authorization.

Any incident occurring during project activities which is considered by the biological monitor to be in non-compliance with the mitigation plan shall be documented immediately by the biological monitor. The FCR shall ensure that appropriate corrective action is taken. Corrective actions shall be documented by the monitor. The following incidents shall require immediate cessation of the construction activities causing the incident, including 1) imminent threat of injury or death to a desert tortoise; 2) unauthorized handling of a desert tortoise, regardless of intent; 3) operation of construction equipment or vehicles outside a project area cleared of desert tortoise, except on designated roads, and 4) conducting any construction activity without a biological monitor where one is required (see Term and Condition 2.1). If the monitor and FCR do not agree, the Federal agency's compliance officer shall be contacted for resolution. All parties may refer the resolution to the Federal agency's authorized officer."

After completion of the project, the participating agency which authorized the project shall conduct a review to determine if the project proponent complied with the conditions of authorization. Corrective actions shall be required of the proponent where conditions have not been met.

4. Compensation

A mitigation fee based on the amount of acreage disturbed shall be required of proponents of new development. The formula used to determine the amount of acreage to be acquired is described in the California Statewide Desert Tortoise Management Policy and considers the following factors:

1) Habitat category,
2) Impact on adjacent lands reducing tortoise densities,
3) Whether or not the use will tend to induce growth,
4) Duration of the effect (i.e., short term = less than 10 years, long term = greater than 10 years).
5) Whether or not there is moderate to heavy existing disturbance

These factors are added together to arrive at an acreage multiplier use to determine the amount of compensation acres to be acquired by the project proponent. Category III habitat receives a compensation rate of 1.0 regardless of other factors.

5. Tortoise Seasonal Restrictions

To the extent possible, activities shall be scheduled when tortoises are inactive (November 1-March 15). Dual-sport (non-speed, trail-ride) events and non-emergency maintenance of roads are restricted to this season.

6. Pre-Construction Clearance Surveys

Pre-construction surveys shall be conducted to locate and remove desert tortoises prior to grading or actions which might result in harm to a desert tortoise or which remove tortoise habitat. The survey shall be conducted by an Authorized Biologist within 24 hours of the onset of the surface disturbance unless a

tortoise-proof fence has been installed that would prevent re-entry of the animals.

7. Site Fencing and Hazard Removal

During the tortoise active season, March 15 - November 1, no overnight hazards to desert tortoises (e.g., auger holes, trenches, pits, or other steep-sided depressions) shall be left unfenced or uncovered; such hazards shall be eliminated each day prior to the work crew leaving the site.

Large or long-term project areas shall be enclosed with tortoise-proof fencing to keep desert tortoises out of the work area. The fencing shall be wire mesh with a maximum mesh size of ½" square fastened securely to posts. The wire mesh shall extend at least 18 inches above the ground and preferably about 12 inches underground. Where burial is not possible, the lower 12 inches shall be folded outward and fastened to the ground. Any gates or gaps in the fence shall be constructed to prevent entry of tortoises. The fencing shall be removed when restoration of the site is completed.

Temporary fencing shall be required around test sites where trenching or drill holes could trap animals or around other small, short-term projects where tortoises could move into the work area. Occasionally, seasonal restrictions and/or monitoring may be substituted to alleviate the need for fencing.

Fenced areas are to be cleared of tortoises by an Authorized Biologist prior to project activities.

8. Surface Disturbance

All surface disturbing activity shall be limited to the land area essential for the project. In determining these limits, consideration shall be given to topography, public health and safety, placement of facilities, and other limiting factors. Work area boundaries and special habitat features shall be appropriately marked to minimize disturbance. All workers shall strictly limit their activities and vehicles to the areas marked. All workers shall be trained to recognize work area markers and to understand equipment movement restrictions. Where possible, previously disturbed areas shall be used as worksites and for storage of equipment, supplies, and excavated material.

Blading of work areas shall be minimized to the extent possible. Pre-construction activity, such as removal of vegetation, shall occur in the presence of a Qualified Biologist. Disturbance of shrubs shall be avoided to the extent possible. Where shrubs must be disturbed, they shall be crushed rather than bladed or excavated.

Project maintenance and construction, stockpiles of excavated materials, equipment storage, and vehicle parking shall be limited to existing disturbed areas wherever possible. Should use of existing disturbed areas prove infeasible, any new disturbance shall be confined to the smallest practical area, considering topography, placement of facilities, location of burrows or vegetation, public health and safety, and other limiting factors. Special habitat features, particularly tortoise burrows, shall be flagged by the Qualified Biologist so that they may be avoided by installation equipment and during placement of poles and anchors.

9. Biological Monitor

For activities conducted between March 15 and November 1 in desert tortoise habitat, construction and operation activities shall be monitored by a Qualified Biologist approved by BLM. The Qualified Biologist shall be present during all activities in which encounters with tortoises may occur. The Qualified Biologist shall watch for tortoises wandering into the construction areas, check under vehicles, examine excavations and other potential pitfalls for entrapped animals, examine exclusion fencing, and conduct other activities

necessary to ensure that death or injuries of tortoises is minimized.

10. Refuse Disposal

All trash and food items generated by construction and maintenance activities shall be promptly contained and regularly removed from the project site to reduce the attractiveness of the area to common ravens and other desert predators. Portable toilets shall be provided on-site if appropriate.

11. Dogs

Dogs shall be restrained either by enclosure in a kennel or by chaining to a point within the tortoise-proof exclosure if one has been constructed for the activity.

12. Ravens

Structures which may function as common raven nesting or perching sites are not authorized except as specifically stated in the appropriate BLM document. The proponent shall provide a graphic description of all structures to be erected on the site. Some actions are required to mitigate actual nesting on authorized structures, such as requiring the proponent to secure necessary permits to remove nests and to remove such nests in a timely fashion. USFWS does not (or rarely) authorize nest removal if birds are present in the nest, but does authorize nest removal after birds have left.

13. Motorized Access

Where possible, motor vehicle access shall be limited to maintained roads and designated routes. Where temporary access off a maintained road or designated route is permitted, a Qualified Biologist shall travel with each work crew to ensure that all desert tortoises and their burrows are avoided and that impact to the habitat is minimized. All vehicle tracks that might encourage public use shall be obliterated after temporary use.

Where access from a maintained road or designated route to a project's site is part of the approved development plan, length and location of the route shall be designed to minimize impact to the habitat. The amount of disturbed area shall be subject to the mitigation fee, and the route shall be designated "Limited Use" and not open to the public.

a. **Speed Limits**: Vehicle speed within a project area, along right-of-way maintenance roads and on routes designated for limited use shall not exceed 20 miles per hour. Speed limits shall be clearly marked by the proponent, and workers shall be made aware of these limits.
b. **Tortoises Under Vehicles**: Vehicles parked in desert tortoise habitat shall be inspected immediately prior to being moved. If a tortoise is found beneath a vehicle, the Authorized Biologist shall be contacted to move the animal from harms-way, or the vehicle shall not be moved until the desert tortoise leaves of its own accord. The Authorized Biologist shall be responsible for taking appropriate measures to ensure that any desert tortoise moved in this manner is not exposed to temperature extremes which could be harmful to the animal.

14. Route Maintenance and Surface Restoration

The following mitigation measures shall be implemented during all route maintenance and surface restoration projects:

a. **Heavy Equipment**: Operators of heavy equipment (such as roadgraders) shall be accompanied by a biological monitor who is a Qualified Biologist when working in desert tortoise habitat during the desert tortoise's active period (March 15 to October 31). The biological monitor shall walk **in front** of the equipment during its operation and shall function as the FCR and have the responsibility and authority to halt all project activity should danger to a desert tortoise arise. Work shall proceed only after hazards to the desert tortoise are removed, the desert tortoise is no longer at risk, or the desert tortoise has been moved from harms way by an Authorized Biologist. This measure does not currently apply to County or Caltrans road work on BLM land.

   During the desert tortoise's inactive period (November 1 to March 15, an on-site monitor is not required. The operator shall watch for desert tortoises while using the equipment and shall have the responsibility for preventing harm to desert tortoises by proceeding only after hazards to the desert tortoise are removed or the desert tortoise is no longer at risk.Operators of light equipment used for trail maintenance and project leaders for surface reclamation actions shall watch for desert tortoises during all project activities. They shall have the responsibility for preventing harm to desert tortoises by proceeding only after hazards to the desert tortoise are removed or the desert tortoise is no longer at risk.

b. **Injury**: Should any desert tortoise be injured or killed, all activities shall be halted, and the Authorized Biologist immediately contacted. The biologist shall have the responsibility for determining whether the animal should be transported to a veterinarian for care, which is paid for by the project proponent, if involved. If the animal recovers, USFWS is to be contacted to determine the final disposition of the animal; few desert tortoise are returned to the wild.
c. **Report**: The equipment operator, or Authorized Biologist shall keep a tally of all desert tortoises seen, moved, injured or killed during the project. Other required elements are 1) rating the effectiveness of required mitigation, 2) a breakdown of actual habitat disturbance, and 3) suggestions for improving mitigation.
d. **Water Ditches**: The equipment operator or Qualified Biologist shall inspect water ditches for desert tortoise burrows before moving or shoveling any soil. If a desert tortoise burrow is present, the water ditch shall be left undisturbed if possible. The equipment operator shall inspect water ditches for desert tortoise burrows.
e. **Burrows**: If a burrow is occupied by a desert tortoise and avoidance of the burrow is not possible during road maintenance or reclamation activities, the Authorized Biologist shall make the final determination. Only an Authorized Biologist may excavate the desert tortoise, following established protocols.
f. **Grading**: To avoid building up tall berms that may inhibit desert tortoise movement, the operator should minimize lowering of the road bed while grading. Berms higher than 12 inches or a slope greater than 30 degrees shall be pulled back into the road bed. Where it is not feasible to meet these requirements, berms will be mitigated through such means as artificial breaching at washes intersections or ditch-outs for drainage with adequate spacing.
g. **Speed Limits**: The equipment operator shall watch for desert tortoises on the road whenever driving, transporting or operating equipment. Driving speeds shall not exceed 20 miles per hour, and operating speeds should not exceed 5 miles per hour to allow for adequate visibility.

SPECIAL MITIGATION FOR SPECIFIC USES

15. Mineral Exploration and Development

In addition to mitigation measures described above for general mitigation, the following special mitigation measures shall apply to small mining operations and minor exploration and test drill holes in which the surface disturbance or area from which desert tortoises are to be removed is less than ten acres:

a. **Compliance**: A Qualified Biologist shall be on-site during the initial mining activity.
b. **Explosives**: If explosives are authorized, the BLM's field office biologist shall verbally consult with the appropriate USFWS office to determine what measures shall be required to reduce the potential to take desert tortoises. This measure may include:

1) Seasonal restrictions upon the use of explosives;

2) Temporary removal of desert tortoises from areas potentially at risk during detonation either directly from the explosion or by thrown materials. All handling and storage of desert tortoises for this purpose shall be conducted as described in Measure 3 by an Authorized Biologist.

3) Covering of desert tortoise burrows to reduce impacts of flying materials.

16. Non-Competitive Recreational Events

The following measures shall apply to all vehicle-oriented, dual-sport, and other non-competitive trail events:

a. **Timing**: Events shall be held during the hibernation season for desert tortoises, generally considered to be between November 1 and March 1. Routes selected shall avoid impacting other special status plants and animal species. Any course flagging or markers shall be placed on the course not more than two weeks prior to the event and shall be removed within one week after conclusion of the event.
b. **Limits**: The event shall be restricted to designated routes and limited to 500 rider participants per event. Participants shall not exceed 30 miles per hour through Category I and II tortoise habitat. They shall be notified of this requirement at the beginning of the event and before the start of the event on any subsequent days. Racing shall be prohibited.
c. **Maps**: A map identifying the course shall be furnished to each entrant. The map shall clearly delineate maximum speed limits, authorized camp sites, and Conservation areas and shall include a statement cautioning that travel beyond the edge of the roads into undisturbed habitat is strictly prohibited.
d. **Parking**: Vehicles shall be parked at the side of the road or areas devoid of any perennial vegetation. Any entrants who abandon the event must exit the course on designated routes or public roads.
e. **Camping**: Overnight camping shall be limited to existing campgrounds or designated camp sites capable of accommodating the group. Selected camping areas shall be surveyed by a Qualified Biologist prior to the event to determine if desert tortoise burrows or other special status plant or animal species are present.
f. **Trash**: Trash and food items shall be carried out by the participants. The event proponent shall be responsible for assuring that trash and garbage are not left behind.
g. **Injury**: Injured tortoises found on the course shall be transported to an approved

veterinarian (list provided to event organizers) at the earliest possible time. The proponent shall be responsible for the cost resulting from treatment of desert tortoises whose injuries resulted from the event.

h. **Clearance**: The entire course shall be swept by an Authorized Biologist within an hour before the event. In addition, an Authorized Biologist shall travel at the front of the event to ensure that the route is cleared of all desert tortoises. Desert tortoises found shall be moved approximately 100 feet off the course.

17. Competitive Events

These measures apply to organized off-highway vehicle events in designated vehicle open areas.

a. Organized event promoters and sponsors shall designate an FCR responsible for overseeing compliance with the special desert tortoise stipulations.
b. Prior to commencing the event, organized event promoters and sponsors shall provide event participants and spectators with the BLM's printed materials describing: the occurrence of the desert tortoise in the area, the status of the desert tortoise, prohibitions against take and the penalties associated with take, and methods being employed as a part of the event to protect the desert tortoise and its habitat.
c. Organized event promoters and sponsors that fail to comply with any of the special recreation permit stipulations shall be prosecuted to the fullest extent possible.
d. Trash containers used for race event shall be raven-proof. Trash and food items shall be promptly contained and removed from the area within 24 hours of completion of the event.
e. Participants that violate any special desert tortoise stipulation shall be disqualified from the event. Support team members that fail to comply with the stipulations shall result in disqualification of the associated rider(s). Anyone who accumulates three violations shall be barred from participating in any organized off-highway vehicle event for one year from the date of the third violation.

18. Utility Pipelines and Underground Cables

For construction and maintenance of all pipelines, fiber-optic lines, and other utilities requiring trenching, the following measures shall apply:

a. **Width**: Construction rights-of-way shall be restricted to the narrowest possible width.
b. **Exceptions**: All project construction and maintenance shall be restricted to the authorized right-of-way. If unforeseen circumstances require expansion beyond the right-of-way, the potential expanded work areas shall be surveyed for desert tortoises.
c. **Access**: Vehicular travel shall be limited to the right-of-way. Access to the right-of-way shall be limited to public roads and designated routes.
d. **Trenches**: Open trenches shall be regularly inspected by the Authorized Biologist at a minimum of once per day, and any desert tortoises that are encountered shall be safely removed. For small projects, escape ramps are sometimes required. The length of the trench left open at any given time shall not exceed that distance which will remain open for one week or less in duration. A final inspection of the open trench segment shall be made by the Authorized Biologist immediately prior to backfilling. Arrangements shall be made prior to the onset of maintenance or construction to ensure that desert tortoises can be removed from the trench without violating any requirement of the Occupational Safety and Health Administration.

e. **Maintenance**: Observations of desert tortoises or their sign during maintenance shall be conveyed to the field supervisor and a biological monitor. Employees shall be notified that they are not authorized to handle or otherwise move tortoises encountered on the project site.

f. **Compliance**: Sufficient Authorized and Qualified Biologists shall be present during maintenance or construction activities to assist in the implementation of on-site mitigation measures for the desert tortoise and to monitor compliance. The appropriate number of biologists will depend upon the nature and extent of the work being conducted and shall be stated in the right-of-way grant for each particular action, after consultation with the specific resource area office authorizing the action.

g. **Final Assessment**: The authorizing agency shall ensure that maintenance or construction activities are confined to the authorized work areas by means of a post-project assessment. The assessment may be conducted by the Authorized Biologist. If maintenance or construction activities have extended beyond the flagged work areas, the BLM shall ensure that the project proponent restores these disturbed areas in an appropriate manner.

h. **Restoration**: The proponent shall be required to restore disturbed areas in a manner that would assist re-establishment of biological values within the disturbed rights-of-way. Methods of restoration shall include, but not be limited to; road closure, the reduction of erosion, respreading of the top two to six inches of soil, planting with appropriate native shrubs, and scattering any bladed vegetation and rocks, where appropriate, across the right-of-way.

19. Power Transmission

The following mitigation measures shall be implemented during all construction and maintenance of transmission lines:

a. **Surveys**: When access along the utility corridor already exists, pre-construction surveys for transmission lines shall provide 100 percent coverage for any areas to be disturbed and within a 100-foot buffer around the areas of disturbance. When access along the utility corridor does not already exist, pre-construction surveys for transmission lines shall follow standard protocol for linear projects.

b. **Access**: To the maximum extent possible, access for transmission line construction and maintenance shall occur from public roads and designated routes.

c. **Disturbed Areas**: To the maximum extent possible, transmission pylons and poles, equipment storage areas, and wire-pulling sites shall be sited in a manner that avoids desert tortoise burrows.

d. **Restoration**: Whenever possible, spur and access roads and other disturbed sites created during construction shall be recontoured and restored.

e. **Ravens:** All transmission lines shall be designed in a manner that would reduce the likelihood of nesting by common ravens. Each transmission line company shall remove any common raven nests that are found on its structures. Transmission line companies must obtain a permit from the USFWS's Division of Law Enforcement to take common ravens or their nests.

20. Fire Management

a. Federal land management agencies will assign an environmental specialist on all wildfires exceeding initial attack.

b. Before the beginning of each fire season, firefighters and support personnel will be provided with a briefing on tortoises and their habitat. This education program will focus on minimizing take of any listed species, particularly take due to vehicle use.
c. On-road travel speeds will be kept low to reduce take of desert tortoise.
d. Off-road vehicle travel will be restricted to the minimum necessary to suppress wildfires.
e. Individuals trained to recognize tortoises and their shelter sites will precede any vehicle traveling off-road.
f. Camps, staging areas, and helispots will be pre-surveyed for tortoises and burrows by the assigned environmental specialist. Camps will be established within previously disturbed areas whenever possible.
g. Some effects of suppression may require rehabilitation action (e.g., surface disturbance from dozers).
h. Some burned areas may require monitoring and follow-up treatment to promote return of native species and discourage exotic species.

PROJECT REPORTING

For each project on which the consultation is to be applied, the BLM will transmit a reporting form (Attachment I) to the appropriate USFWS field office at least 30 days prior to authorizing the activity. If there is no response after 30 days, the project may be approved.

Each Field Office will report to the California Desert District Office the actual acres disturbed, the number of tortoises moved, and the number of tortoises killed within 30 days of the completion of each project covered under this consultation. The California Desert District Office will report annually on these projects to the Ventura and Carlsbad field Offices of USFWS.

The BLM's California Desert District maintains a tabular and GIS record of all compensation acquisitions.

Attachment I

Reporting Form

REPORT ON PROPOSED ACTION TO BE COVERED BY THE PROGRAMMATIC CONSULTATION ON ACTIVITIES RESULTING IN SMALL DISTURBANCES OF DESERT TORTOISE HABITAT IN THE CALIFORNIA DESERT

Authorization may not be issued until USFWS has 30 days for review and comment. For actions in Inyo, Kern, Los Angeles, and transmontane San Bernardino Counties, send to USFWS, Field Office Supervisor, 2493 Portola Road, Suite B, Ventura, CA 93003. For actions in Riverside, Imperial, and cismontane San Bernardino Counties, send to USFWS, Carlsbad Field Office Supervisor, 2730 Loker Avenue West, Carlsbad, CA 92008. ** Send a copy to BLM California Desert District T&E Coordinator.

Name of Project: _____ BLM Case File No.: _____

Type of Activity: _____

BLM Contact:_____ Date of Preparation:_____

Location of Activity: Base Meridian ___ Township ___ Range ___ Section ___

General locality: _____
_____

BLM Field Office: _____
or other jurisdiction: _____

Tortoise Critical Habitat Unit: _____
Tortoise Recovery Unit: _____
BLM Tortoise Habitat Category (I, II, III): _____

Brief description of project (include site photographs, topographic map of location, and proposed construction dates):

_____
_____
_____
_____
_____
_____
_____
_____
_____

Stipulations to be applied (list specific stipulation numbers from biological opinion):

_____

Attachment II - Handling of Desert Tortoise

Only an "Authorized Biologist" (see Measure 1) shall handle a desert tortoise. No handling activities shall begin until an Authorized Biologist is approved. Authorization for handling shall be granted under the auspices of the Section 7 consultation. BLM Field Office Biologists are authorized to handle tortoises in accordance with these measures.

If a tortoise or clutch of eggs is found in the project area, to extant practical, activities shall be modified to avoid harm or injury to it. If activities cannot be modified, the tortoise or clutch shall be moved from harm's way the minimum distance possible within appropriate habitat ensure its safety from death, injury, or collection. The Authorized Biologist is allowed some discretion to ensure that survival of each relocated tortoise or clutch is likely.

In handling desert tortoises, the Authorized Biologist shall follow the techniques for handling in "Guidelines for Handling Desert Tortoise during Construction Projects (LaRue 1994). Desert tortoises moved shall be marked for future identification in the event that a dead tortoise is found later in the project area.. An identification number using the acrylic paint/epoxy covering technique shall be placed on the fourth left costal scute as described the Handling Protocol. A 35-mm sidle of the carapace, plastron, and the fourth costal scute shall be taken.

No notching of scutes or replacement of fluids with a syringe is authorized.

The Authorized Biologist shall maintain a record of desert tortoises handled. This information shall include the following:

1. The location (narrative and map) and dates of observations;
2. General condition and health of the tortoise, including injuries and state of healing and whether the animal voided its bladder;
3. location moved from and to;
4. Diagnostic markings (e.g., scute markings);
5. Slide photograph of each tortoise handled.

Encounters with listed species shall be reported to the FCR. The FCR shall maintain a record of all listed species encountered during project activities. Information recorded shall be the same as that for animals that were handled.

Upon locating dead, injured, or sick individuals of a listed species, the Federal land management agency must be notified immediately. The agency must make or verify initial notification to the Service's Division of Law Enforcement at (310) 297-0062 in Torrance, California, within three working days of its finding. The Service's Field Office within whose area of responsibility the specimen is recovered shall also be notified (Carlsbad: 619-431-9440; Ventura: 805-650-9845). The agency must make written or verify notification within five calendar days and include the date, time, and location of the carcass, a photograph, caused of death, if known, and any other pertinent information. Care must be taken in handling sick or injured animals to ensure treatment and care, and in handling dead specimens to preserve biological material in the best possible state.

The Federal land management agency in that area shall endeavor to place the remains of intact listed species with educational or research institutions holding the appropriate State and Federal permits per their instructions. If such institutions are not available or the animal's remains are in poor condition, the information noted above shall be obtained and the carcass left in place. If the animal is a desert tortoise, the carcass shall be marked in a manner that would not be toxic to other wildlife to ensure that it would not be re-recorded in the future. Arrangements regarding proper disposition of potential museum specimens shall be made with the institution prior to implementation of the action. Animals injured by project activities should be transported to a qualified veterinarian. Should any treated animals survive, the appropriate Service field office should be contacted regarding the final disposition of the animals.

Appendix E
Desert Restoration

Many new ideas for restoring desert habitats are being developed. Their implementation should improve restoration, both qualitatively and temporally, on a general basis and for sensitive areas as well. A comprehensive and long-term effort is in progress through the efforts of the Desert Restoration Task Force (DRTF), a committee to the Desert Managers Group. This committee has developed a planning and methods publication on the subject. Over the years, the Desert Managers Group will also play an important support role regarding monitoring and research proposals, in the form of improving site planning, applications and priorities. An important point to make is that restoration is a developing science. Tried and tested site planning and application techniques will be used, but experimentation will also be encouraged to advance the science. There are too many considerations and variables to "cook-book" restoration by species and habitat, so the purpose of this appendix is to convey a degree of thought and common actions developed by the DRTF so that the reader gets an idea about what to expect and visualize when restoration is discussed. In the final analysis, it will be left to case by case field applications (i.e., by project) to evaluate the needs and specify actions, expense, and priorities for restoration.

The NECO Science Panel, which met on November 12, indicated that disturbance is not entirely a negative ecological condition. Wash, wind, tectonic, fire and other violent natural forces cause disturbance in addition to what humans create. Variables to consider in restoration may include the amount, location, nature, and effects of disturbance and other constraints. Disturbance is one of several natural ecological processes. Disturbances which pose serious problems that do not lend themselves to a "construction" solution and are not addressed here, include disease, unnatural change to fire regime, and exotic plants. The challenge to land managers in dealing with disturbance is to develop restoration protocols for human-caused disturbance that are need/goal defined, are cost effective, consider situation context and other constraints, and leave sites in conditions that approximate natural disturbance and restoration. To meet this mandate, decision makers must apply site planning and review a variety of technical applications.

Site planning and restoration considerations may include:

1. **Special Status Species**
   - listed, proposed for listing, sensitive
   - species-habitat relationships that apply.
2. **Plant Community**
   - common, rare
   - site quality
3. **Management Goals**
   - general management goals
   - special management goals (e.g., DWMA, WHMA, species and sensitive habitats). This consideration is critical and can make the difference between a minimally necessary and special needs restoration and cost.
4. **Ecological Processes**
   - determine the preexisting condition, distribution of species and habitats
   - most important to restore and that humans can effect
   - commonly considered are soil, hydrologic, wind functions, movement of animals, sources and movement of seed.
5. **Conservation Principles**
   - patch size (fragmentation)
   - cover stories
   - corridors
   - habitat conversion to exotic species

6. **Site Context**
   - site in area of habitat
   - site in the range(s) of species
   - site quality
   - cumulative situation, if any, of this site, with others of a permanent/temporary disturbance nature
7. **Site Analysis/Pre-existing Site Condition** - constraints and objectives
   - Topography, Slope, Aspect
   - Landforms (e.g.,washes, desert pavement, sand systems)
   - Surface and Subsurface Soils
   - Vegetation
   - Subsurface organic matter
   - Surface texture/micro-habitat: organic debris, soil, sand, rock texture
8. **Constraints**
   - Can approximate original topography be achieved?
   - Is compaction a problem?
   - Historic use patterns
   - Are materials on hand to recreate original surface texture?
   - Are there uses to prevent or that could impair restoration efforts?
   - Time
   - Cost
9. **Common applications** (not for all situations)
   - Grading (topography, landform, microtopography, surface texture)
   - Replacing topsoil
   - Increasing soil moisture through mulching surface or subsurface (non contaminated with chemicals or weed seeds), imprinting, pitting
   - Treating compacted soils
   - Capturing and holding seeds through imprinting and pitting
   - Seeding (seed treatment) with locally gathered/commercially available seed
   - Individual plantings/Irrigation (costly, uncommon)
   - Erosion control
   - Plant salvaging/replanting
   - Exotic plants control
   - Maintenance measures
10. **Monitoring Program**
    - Contingency measures
11. **Success Criteria**
    - Tied to bonding and bank release

APPENDIX F
Public Education Program from the California Statewide Desert Tortoise Management Policy

[The following is from Chapter VIII, "Public Education Program," of the *California Statewide Desert Tortoise Management Strategy*, which was signed by the BLM California State Director and Director of the California Department of Fish and Game in October 1992. This abbreviated version contains the entire introduction and all planned actions. Details, such as lead responsibility, target year, and estimated cost for each action have been deleted. Some of the actions have been completed, some have not, and some are on-going.]

"Bureau policy as stated in "Desert Tortoise Habitat Management on the Public Lands: A Rangewide Plan" (Spang *et al*. 1988) is that each state shall embark on an aggressive public education program concerning tortoise populations and habitats to promote compliance with State and Federal laws and to reduce unnecessary mortality. As the first step in this campaign, the Rangewide Plan requires development of a desert tortoise public education plan in each state.

The California Department of Fish and Game and U.S. Fish and Wildlife Service play key roles in managing and protecting desert tortoise populations and habitat. The assistance of these agencies will be required to implement an effective public education program. The participation of other State and Federal agencies with jurisdiction over tortoise habitat will be important, as well.

In addition to governmental agencies, several private organizations share concern for the desert tortoise and have valuable expertise. The Desert Tortoise Council, Desert Tortoise Preserve Committee, and California Turtle and Tortoise Clubs have been very active in assisting agencies with public education by developing brochures and slide presentations, leading public tours, developing signs and kiosks, and holding public forums and conferences.

Close cooperation between all of these agencies and organizations will enhance any efforts to benefit desert tortoises through increased public education. The following plan is built upon the proposition that the agencies can positively impact public knowledge of and behaviors toward the desert tortoise.

The specific objectives of the public education plan are to:

- increase public awareness of the need to protect desert tortoises and their habitat on California's Public Lands;
- increase public knowledge of State and Federal laws and regulations protecting desert tortoises;
- educate the public regarding their role in protecting tortoises and tortoise habitat;
- modify social behavior in a manner that benefits desert tortoise populations and their habitat; and
- increase public knowledge of and support for agency actions to benefit desert tortoises and their habitat."

STRATEGY A: Enhance public knowledge of desert tortoises (e.g., their evolution, life cycle, and habitat needs), stressing the need for their protection.

ACTION 1: Support efforts of museums, zoos, and other public institutions to develop permanent desert tortoise exhibits.
Target audience: General public, including schoolchildren.

ACTION 1-a: Continue support of the San Bernardino County Museum's effort to develop a desert tortoise exhibit.

ACTION 1-b: Offer support to the California Living Desert Museum in Bakersfield by providing assistance and brochures for their desert tortoise exhibit.

ACTION 1-c: Offer support to the Living Desert Reserve in Palm Desert in operating their outdoor interpretive program involving a live-tortoise exhibit.

ACTION 1-d: Offer support to the Mojave Narrows Regional Park in Victorville in developing an outdoor interpretive program involving a live-tortoise exhibit.

ACTION 2: Develop a portable desert tortoise exhibit primarily for use in museums throughout Southern California.

ACTION 2-a: Design and produce the portable exhibit.

ACTION 2-b: Seek exhibit space at local museums.

ACTION 2-c: Circulate exhibit to area museums and provide necessary maintenance.

ACTION 3: Develop tortoise displays for Federal and State agency offices.

ACTION 3-a: Construct a tortoise display for the Bureau's California Desert Information Center in Barstow.

ACTION 3-b: Explore other opportunities and encourage other agencies (e.g., State Parks, Regional Parks, National Monuments) to develop desert tortoise exhibits and displays within their visitor centers.

ACTION 4: Develop educational packets for use in classrooms.

ACTION 4-a: Complete desert tortoise segment of Bureau's California natural resources videotape series and distribute to schools statewide.

ACTION 4-b: Develop and print coloring books for elementary students.

ACTION 4-c: Produce educational posters for classrooms.

ACTION 4-d: Design and produce desert tortoise stickers for children.

ACTION 4-e: Develop a teacher's handbook for their use in teaching units about the desert tortoise.

ACTION 4-f: Develop a desert tortoise game for elementary students and make it available for incorporation into Project Wild materials.

ACTION 5: Work with university/media/corporate sponsor(s) to develop a quality video on desert tortoises for release to network, local, and cable television stations.

ACTION 6: Encourage media feature coverage of desert tortoises and their environment.

STRATEGY B: Educate the public regarding their role in protecting wild desert tortoise populations and their habitat.

ACTION 7: Develop an informational reference book for agency information desks, rangers, and wardens.

ACTION 8: Produce informational brochures and leaflets for distribution to the general public and targeted audiences.

ACTION 8-a: Develop a general informational brochure describing what the public can do to assist the desert tortoise. The brochure will target a general public for distribution at county fairs, desert information outposts, agency offices, rest areas/truck stops, and to captive tortoise permittees.

ACTION 8-b: Develop a general informational brochure aimed toward schoolchildren for

distribution at school presentations or as part of the teaching unit in Strategy A.

ACTION 8-c: Develop a series of brochures targeted toward specific users of the Desert (e.g., OHV users, sheepherders, hunters and shooters, and campers); illustrate their potential role in helping the tortoise.

ACTION 9: Design and erect a new sign at the Desert Tortoise Natural Area; include in the sign appropriate behavior messages and offer an "800" telephone number for information on tortoise adoption.

ACTION 10: Design, produce, and distribute desert tortoise posters with protection message.

ACTION 11: Work with CALTRANS to design and install separate, free-standing, interpretive kiosks with desert tortoise protection information at highway rest areas.

ACTION 12: Develop and produce print media, radio, and television public service announcements for distribution throughout Southern California.

ACTION 13: Review tortoise information in the Bureau's Desert Access Guide series and other agency publications/maps for possible revision or inclusion.

ACTION 14: Develop and produce portable displays for use at county fairs, shows, agency offices, shopping malls, etc.

ACTION 15: Develop a brochure/leaflet for distribution to tortoise permittees explaining the problems with unauthorized release of captive tortoises into wild populations.

ACTION 16: Encourage involvement of individuals, interest groups, students, Scouts, etc., in volunteer projects which benefit desert tortoises.

STRATEGY C: Increase public knowledge of State and Federal regulations protecting desert tortoises and modify public behavior to benefit tortoises.

ACTION 17: Develop a brochure explaining Federal listing of the desert tortoise and its effects.

ACTION 18: Include regulatory information in other publications/products outlined above.

ACTION 19: Develop and publish a flyer for distribution by rangers and wardens stressing appropriate behavior while in desert tortoise habitat.

ACTION 20: Publicize law enforcement actions and court-imposed penalties for offenders.

STRATEGY D: Increase public knowledge of and support for agency actions benefitting desert tortoises.

ACTION 21: Provide accurate, timely, and detailed information to media in advance of actions through news releases, fact sheets, media tours, press conferences, media packets, etc.

ACTION 22: To develop broad-based support for management actions, maintain close cooperation among agencies and private organizations benefitting tortoises to keep them apprised of and involved in decision-making.

ACTION 23: Update existing slide programs and possibly convert them to videotape for use in presentations to interest groups, California Desert Information Center visitors, local/county/state/federal officials, and at county fairs.

ACTION 24: Develop a series of 5-10 minute slide programs or videos relating agency efforts to protect tortoises populations and habitat. Topics might include the following:

Disease control,
Raven predation and control,
Habitat acquisition,
Vehicle use in sensitive tortoise habitat,
Tortoise population trends and study plot data

The videos might target agency employees, interest groups, or the general public.

ACTION 25: Make presentations at professional symposia.

APPENDIX G
Limitation on Cumulative New Surface Disturbance

It is proposed that cumulative new surface disturbance on lands administered by Federal and State agencies within Desert Wildlife Management Areas (DWMAs) shall be limited to 1 percent (or, alternatively, 3 percent). The amount that may be disturbed will be apportioned among the various participating agency jurisdictions.

Rationale - The limit of 1 percent on cumulative surface disturbance is intended to show a high level of commitment to conservation of natural habitats. It is expected to accommodate the needs of those activities that must occur in a DWMA. Among these are communication sites, maintenance of existing and construction of new utilities in designated utility corridors, and mining. It is anticipated that retaining 99 percent of what is presently in natural condition will be sufficient for maintaining viable populations of all species that are dependent upon the DWMA; conserving lesser amounts might be arguable. The commitment to limiting cumulative disturbance is an alternative to the prohibition on specific classes of activities based merely on our ability to prohibit them rather than on their expected level of occurrence and size, their need, their public value, etc.

Specifics - Surface disturbing activities are those that result in elimination of perennial plant cover over an area. Elimination may result from blading or otherwise destroying plant roots and severely disturbing soil structure, or it may be less severe in the form of crushing of above-ground plant parts. The localized effects of new corrals or livestock watering sites will be considered surface disturbing, but general grazing will not be. Burned areas will not be included under the cumulative limitation.

Surface disturbing activities will be recorded on 7.5-min. topographic maps and entered into a GIS data base as they are permitted. Unauthorized disturbances will also be entered as they are discovered. Disturbances on private lands may also be recorded but will not be limited to 1 percent cumulative disturbance. It would be useful to have existing surface disturbance digitized from baseline aerial photos; new aerial photos could be periodically (e.g., every 5 years) analyzed to determine the full extent of unauthorized disturbance.

Lands acquired by an agency will be considered added to the base in their condition at the time of acquisition. That is, disturbance present on the parcel at the time of acquisition will not be added to the cumulative new disturbance.

If an interstate highway or state highway is widened and creates new surface disturbance in a DWMA, the new disturbance will not be covered by the cumulative limit if highway fencing is added. The fencing will result in increased animal populations along the highway due to decreased wildlife mortality on the road. In addition, there may be a decrease in raven populations as roadkills supporting ravens are reduced. [Raven populations are at elevated levels due to human-related factors, and they are known to be preying heavily on some species (e.g., desert tortoise).]

As disturbed lands are restored, they will be subtracted from the cumulative total of disturbed lands. No criteria are set for what would be considered as adequate restoration for a particular site. The adequacy of restoration will be determined on a case by case basis jointly by the BLM and USFWS and does not require full reestablishment of habitat to its pre-disturbance state. However, little if any focus on adequacy evaluation will occur until substantial progress is made. A point at which serious evaluation might occur is described as follows:

> Perennial plants are present in densities and sizes so that impacts are substantially unnoticeable in the area as a whole and so that the area provides food and shelter for key wildlife species. More

specifically, each species in a suite of the most dominant perennial plants prior to disturbance should be reestablished to at least 40 percent of its original density (i.e., number of plants/hectare) and at least 30 percent of its original total cover. The dominant perennial plants are any combination of perennial plants, which formerly accounted cumulatively for at least 80 percent of relative density[1]. There will be no less than two dominant perennial species. The presence of exotic species may become a factor.

The criteria are aimed at restoring both the productivity and the visual aspect of the vegetative community. The specific levels specified in the criteria are those judged to be sufficient to render the impact unnoticeable and the area productive for wildlife in terms of food and shelter. At these levels, soil condition is generally suitable for growing plants, and annual plant cover is usually present. The use of only perennial plant cover in the criteria allows calculation of the restoration requirement in any year and in any season. The use of specific numbers allows the restoration requirements to be known prior to the disturbance, and the restoration success to be judged at any time. It should be noted that some important plants, such as Joshua trees, which are important as an overstory plant but are not dominant, would not be required. Such plants could be required as additional mitigation on a project-by-project basis, but they would not be used to judge restoration for the purposes of reducing the cumulative disturbance. Annual plants are difficult to use in evaluating restoration progress because 1) the number of species is very high, 2) identification is difficult, and 3) the presence of a given species is highly variable from year to year based on factors (e.g., rainfall) unrelated to habitat restoration. The criteria does not preclude the possibility that annual weeds may be present or even prevalent

[1]For example, if perennial plants A, B, and C have relative densities of 70, 13, and 12 percent, respectively, restoration could take place with species A and either (or both) of species B or C.

Appendix H
Species & Habitats Modeling & Development of Management Areas

This appendix describes the development of various biological resources and proposed management maps and areas:

- Natural Communities (plant or vegetation communities)
- Plant and Animal species occurrence
- Plant and Animal richness
- Ecological values ("Hot Spots")
- Desert Wildlife Management Areas (DWMAs) for the desert tortoise
- Bighorn Sheep Wildlife Habitat Management Areas (WHMAs)
- Multi-species Wildlife Habitat Management Areas (WHMAs)

Items I through IV below indicate that, to a considerable degree, the characterization of biological resources and values in the Planning Area is based in modeling. Models are not as precise as exact data, but for the most part such data do not exist and would be extremely costly and time consuming to obtain. However, given the nature of issues and current and foreseeable uses in the Planning Area, it is felt that the sophisticated models described in this appendix serve as adequate basis for management proposals and impacts analyses.

I. Natural Communities

The beginning point was the vegetation map produced for the California GAP Analysis project by University of California at Santa Barbara. For NECO, the Sonoran and Southwest Eco-region maps from GAP were combined. These coverages were created from photo-interpretation of 1990 satellite imagery and supplemented by large-scale maps, photographs, and some field visits. The minimum mapping unit was 100ha (250 acres) for upland sites and 40ha (100 acres) for wetland sites; the mapping scale was 1:100,000.

Since much of the planning analyses and plan development were going to be dependent upon the habitat map, it was decided to put considerable time and effort into improving the accuracy and resolution of the GAP map, particularly for the sensitive habitat types. This was accomplished through several means: NPS surveys of small areas, additional analyses of satellite imagery, use of orth.-photo quads, consultation with knowledgeable ecologists, and an extensive accuracy assessment survey.

First, the GAP map was simplified by collapsing some of the Holland dominant community types into categories we considered useful for our purposes (12 total). Then, known Alkali Playas and Sand Dune areas were flown by helicopter and a global positioning system (GPS) unit was used to define their outlines. This information was incorporated into the simplified GAP map. Other features, such as Hayfield Lake and some Desert Dry Wash Woodlands, were digitized from additional satellite imagery, orthophotos, and hand drawings on quad sheets from the helicopter surveys. The minimum mapping unit for the sensitive habitats was 16ha.

A botanist from the Palm Springs FO was able to do more refined supervised classifications of satellite imagery to identify areas of Desert Dry Wash Woodland, a feature under-represented in the original GAP maps. Due to reflectance differences in the vegetation, this technique could only be applied to the southern half of the Plan area (south of Highway 62). This raster (30m cell) data set was then combined with the vector coverage after using clustering and smoothing techniques in ARC/INFO GRID.

To quantify the accuracy of the original GAP map, an extensive field verification effort was undertaken by

teams of staff and volunteers in the winter of 1996/97. The seven most extensive vegetation types were chosen for sampling (Non-Native Grassland, Sonoran, Mojave, and Chenopod Scrub, Desert Dry Wash Woodland, Sand Dunes, and Playas). A statistician from CDFG provided the guidance to determine the number of points needed in each vegetation type to achieve our goals, following a procedure outlined in Congalton (1991). These numbers depended in part on the level of confidence we had in our existing map (more points were assigned in Chenopod Scrub and Non-Native Grassland) and also in part on the confidence level we wanted for our final result (higher for Desert Dry Wash Woodlands, Sand Dunes, and Playas). Total area of each type was also taken into account. The total number of points needed was determined to be 855. The appropriate number of points were randomly assigned to polygons of the seven selected vegetation types throughout the Plan area using ARC/INFO.

A list of point ID's and their coordinates was generated and used by the surveyors to locate the points in the field with GPS units. Points that were too remote to visit on foot were flown by helicopter. Each site visited on foot was surveyed with a triangular transect 0.5mi on each side. Several types of habitat data were recorded on the transects, including a list of perennial plant species. These lists were used to define the plant community at each site (surveyors did not know the predicted community type for the site).

As a final step, the results of the Accuracy Assessment (AA) were used to further refine the Natural Communities map. As expected, the polygons originally coded Non-Native Grassland were actually mostly Sonoran Creosote Scrub, and much of the Chenopod Scrub areas were reclassified as Mojave Creosote Scrub. Another interesting result was a westward shift in the boundary between Mojave and Sonoran Creosote Scrub. These and other adjustments to the map used the defined community type at the AA points, along with orthophotos (where available) and the expertise of botanists. While it was not possible to quantify the accuracy of the final map, we feel it was a significant improvement over the original version.

Further details on any of these steps are available upon request.

II. Plants and Animal Species List and Occurrence

Predicted occurrence was mapped for each species of concern (except some plants about which too little is known) utilizing a combination of CDFG range maps, points of known occurrence, specific species models, and professional judgement of participating biologists. These maps have not been assessed for accuracy.

The list of Special Status Species includes species that are known to occur in the planning area and are either listed, had special status designations by DFG, BLM, or the FWS, or were considered to be representative of the area. Species were removed from an initial list if there were occurrences in the area, but no recent siting, or was thought to be a migrant, or mistaken for another subspecies (e.g., Bell's vireo). The list was developed through a series of meetings of the NECO wildlife team, noted in Chapter 7. At any point in the planning process list revisions were made by the wildlife team based on newly acquired information.

III. Plant and animal richness

Plant and animal richness maps were derived from site visits to approximately 600 of the 850 AA points noted above (Natural Communities mapping). Predictions of which species might occur at any point was made using the Wildlife Habitat Relationship Program (WHR) developed for California. Numbers were interpolated within each major habitat type across the planning area. The maximum number of species was then determined on a quarter quad (1/4 of a 7.5' topographic sheet) basis. The number of species ranged from 22 to 140 with a mean of 99.

IV. Ecological values ("Hot Spots")

The input layers to this model were considered to represent features in the ecosystem that contribute to its ecological functioning either in terms of representativeness, rarity, umbrella species, or impacts. Thirteen layers were created for this exercise. There were two layers on species richness (one for vertebrates and one

for plants), four layers for sensitive species (known locations and predicted distributions of plants and vertebrates), one layer each for habitat heterogeneity, bighorn sheep, desert tortoise density, special habitats, water sources and insect "hotspots", and a composite layer of different types of landscape fragmentation.

The unit of analysis was the Quarter Quad (QQ) - one quarter of a USGS 7.5min quad sheet. There are 633 QQs in the Plan area, each containing a little less than 10,000 acres. The decision to use the Quarter Quad as the analysis unit was a balance between manageability (processing time for complex analyses), the scale of source data, and the desired level of detail.

The ecological "hotspots" model was created by assigning values to cells of the input layers and combining them in different ways. Each input layer was classified into approximately equal numbers of "high", "medium", and "low" QQs (break points were usually ½ the standard deviation on each side of the mean). QQs containing values below a certain threshold were classified as "none". The results of the 14 analyses described above were grids of QQ cells, each ranked as either high, medium, or low. The characterization of high, medium, or low was determined by the data within the coverage. Scores for each QQ were determined by assigning 3 points to highs, 2 points to mediums, and 1 point to lows and adding the number of points in each QQ. Fragmentation values were assigned inversely (high fragmentation received 0 points, medium 1, low 2, and none 3), the assumption being that fragmentation takes away from the value of an area. The analysis was run three times with different weights applied to selected coverages depending upon what conservation emphasis was being analyzed. The first analysis applied **equal** weight to all the coverages. The second was weighted toward species **richness** - the two coverages on vertebrate and plant richness were weighted double relative to the rest (highs had a value of 6, mediums a value of 4 and lows a value of 2). The third analysis applied a higher weight to species **rarity**. First, the species distribution map of sensitive animal species was weighted according to the following criteria:

Widely distributed/locally uncommon species = 1
Widely rare species = 2
Species endemic to plan area = 3

A second layer was developed with springs and seeps receiving a weight of 1.5 and all other waters a weight of 1. These two new layers, as well as the sensitive habitats layer, were then weighted double and added to the original coverages.

The general pattern for areas of high biological diversity were very similar in all three analyses, with 94-98% correspondence between any two. This result was not unanticipated and confirmed similar results by Dueler and Noss (1990). The results of the equal weight analysis are shown in Map H-1.

V. Designation of Desert Tortoise Desert Wildlife Management Areas (DWMAs):

The boundaries of the large and small DWMAs generally or specifically follow those for critical habitat, but are adjusted on two bases:

1. to follow roads as much as possible for greater manageability, and
2. to exclude areas of low natural occurrence and high use values

Small DWMAs exclude more uses than large DWMAs. Excluded uses are grazing, mining, recreation, private-public checkerboard lands, and areas with higher densities of roads.

DWMAs also overlay portions of CMAGR and BLM wilderness areas. All of JTNP is a DWMA.

VI. Designation of Bighorn Sheep WHMAs:

The Bighorn Sheep Wildlife Habitat Management Areas (WHMAs) include all areas designated as Bighorn Sheep habitat. These habitat areas include transient and permanent habitat, movement corridors, relocation areas, and currently unoccupied habitat. These areas were mapped during a NECO workshop of several Bighorn Sheep biologists in June of 1997.

Unlike the Multi-Species WHMAs, the Bighorn Sheep WHMAs overlap all other management zones, including Tortoise DWMAs and BLM Wilderness areas.

VII. Approach for Designating Multiple-Species Wildlife Habitat Management Areas (WHMAs):

After reviewing the considerable body of existing literature on reserve design (see Scott and Sullivan, 1999, for a review) the wildlife team chose to adapt a method outlined in Bedward et al. 1992. This approach takes into account unsuitable areas, land protection "costs", species/ feature protection targets, and existing protected areas. Each step depends on the previous, so ordering is very important.

Two alternative protection goals were identified: one providing "low risk" to species/habitats, with generally 80% or more of species habitats in the conservation zone, and one providing "high risk" to species/habitats, with a target of at least 50% in the conservation zone. "Risk" is of course difficult to define, and "low" and "high" are used only for comparative purposes. Not all protection targets are exactly 50% or 80% (see Table H-1 and Appendix N tables).

The "conservation zone" is essentially the aggregate of the following management areas: existing restricted areas (JTNP, CMAGR, and BLM wilderness areas), proposed DWMAs, and WHMAs. Multi-species WHMAs address all the special status species as well as the general diversity of species and habitats.

The 80% conservation zone coverage is the basis for the Preferred/Large DWMA and the Small DWMA A Alternatives and the 50% coverage for the Small DWMA B Alternative. Unlike the Bighorn Sheep WHMAs, the system of Multi-species WHMAs is only complimentary to the other elements of the conservation zone. With this in mind, the 80%/50% species/habitats coverages described above refer to the entire conservation zone, not just the Multi-species WHMAs.

The steps used to create the Multi-Species WHMAs were as follows:

Step 1) Identify existing protected areas. In all cases we started with:

- BLM Wilderness
- CMAGR
- NPS
- Unique Plant Assemblages (UPAs)
- Proposed tortoise DWMAs
- Existing biological ACECs

Step 2) Perform GIS overlay analyses to identify percent coverage in the protected areas listed in Step 1 ("GAP" analysis) for species, habitats, and features, then compare to target protection levels (see Table 1), then design WHMAs to correct for "under-representedness".

First, we selected a set of features to be "nuclei" for WHMAs, then added others according to an assigned priority until the target representation levels were attained (see below). Priorities were chosen based upon goals agreed to at previous NECO Wildlife Team meetings and from the March 1998 workshop (listed in bold). Several important ecological features were identified during the March 1998 workshop and were also assigned target protection levels.

Where several units of the same priority level were available, the decision to add was based on (in order): most distant from the areas listed in Step 1 (this was to establish the "nuclei"), consider not only absolute distance but latitudinal and longitudinal variation (**representation, diversity**), adjacency to the above "nuclei" (**contiguity**), within existing large fragments (Map H-4)(reduce fragmentation), connectivity to other protected areas (movement corridors, buffers for changing conditions) and consider disturbance: see

surface disturbance models, and avoid areas with "high" current or predicted disturbance consider exotics (**focus protection where the fewest have been identified so far**)

A. "50%" Alternative: Units of the following features were added until their target is reached (if feasible) - generally 51% of a species or habitat distribution (see Table 1). Units are ¼ of 7.5min USGS quads [QQs] or habitat polygons. Several of these, such as ecological "hotspots", are a result of GIS modeling and will be described in a separate Appendix. The features added and their order of addition were:

1. *highest ecological "hotspot" QQs (Map H-1)(of 6 classes)
2. *highest plant species richness QQs (Map H-2, H-3)(of 3 classes)
3. *highest habitat heterogeneity QQs (of 3 classes)
4. next highest ecological "hotspot" Qqs
5. highest animal species richness QQs (of 3 classes)
6. sensitive plant communities (in order of under-representedness)
7. other plant communities (if any are under-represented)
8. natural water sources
9. next highest ecological "hotspot" Qqs
10. highest combined sensitive animal ranges QQs (3 classes)
11. highest combined sensitive plant ranges QQs (3 classes)
12. insect hotspots
13. next highest plant species richness Qqs (Map H-X)
14. next highest habitat heterogeneity Qqs
15. under-represented plant and animal species, in order of their distance below target protection levels.

*these first three will be the "nuclei" because they best represent overall biological and physical diversity, and plant richness is our best indicator of vegetation diversity

B. "80%" Alternative: Units were added until their target is reached (if feasible)- generally 80% of a species or habitat distribution (see Table H-1). The features added, their order of addition, and the decision rules were the same as for A) above.

Step 3) Look at the product so far and double check for units in unsuitable areas or refine to achieve reserve design goals of contiguity, connectedness, etc.

Step 4) Refine boundaries to be manageable (roughly), then re-run GAP analyses.

Step 5) Check to see where targets have not been met, and add to WHMA system where necessary or feasible (for example, many species have a considerable portion of their distribution on private lands). Also check for efficiency - are some features *over*-represented? Repeat steps 4) and 5) as necessary.

Step 6) Look at the features represented in each area and consider management options. Should some be ACECs (stronger management options)? Could some just be designated "closed" to driving without calling them WHMAs (i.e. playas)? Could some be managed through Plan-wide habitat actions or "point" management?

Table H-1. Target Protection Levels

		Ecological Hotspots			Habitat Type								Insect Hotspots
		Class 6	Class 5	Class 4	Dunes	Playas	Chenopod Scrub	Microphyll woodland	Pinyon-Juniper	Sonoran Scrub	Mojave Scrub	Springs	
% in "conservation zone"	Preferred/Large DWMA Alternative & Small DWMA A Alternative	100	95	95	80	80	80	80	100	75	75	100	80
	Small DWMA B Alternative	75	75	75	51	51	51	51	75	51	51	80	51

		Species									
		Pallid bat	Western mastiff bat	California leaf-nosed bat	Couch's spadefoot toad	Chuckwalla	Mohave fringe toad lizard	Desert roasy boa	Pocketed free-tailed bat	Townsend's big-eared bat	Colorado valley woodrat
% in "conservation zone"	Preferred/Large DWMA Alternative & Small DWMA A Alternative	90	100	90	90	80	80	80	80	80	80
	Small DWMA B Alternative	75	100	75	51	51	51	51	51	51	51

		Species (continued)									
		Mountain lion	Prairie falcon	Elf owl	Gila woodpecker	Vermilion fly catcher	Bendire's trasher	Crissal trasher	LeConte's trasher	Yellow warbler	Cave myotis
% in "conservation zone"	Preferred/Large DWMA Alternative & Small DWMA A Alternative	80	60	100	100	80	80	80	80	80	100
	Small DWMA B Alternative	51	51	75	75	51	51	51	51	51	100

Table H-1 Target Protection Levels

		Species																														
		Fringed myotis	Angel trumpets	Borrego milk vetch	Saguaro	Harwood'smilkvetch	Red grama grass	Crucifixion thorn	Fairy duster	Los animas snakebush	Spiny abrojo	Wiggin's croton	California ditaxis	Glandular ditaxis	Howe's hedgehod cactus	Foxtail cactus	Crown of thorns	Spearleaf	Robison's monardella	Munz's cholla	Sand food	Arizona pholistoma	Lobed ground-cherry	Desert unicorn plant	Orocopia sage	Cove's cassia	Mesquite neststraw	Jackass clover	Mecca aster	Ribbed cryptantha	Wiggin's cholla	Whitemargined beardtongue
% in "conservation zone"	Preferred/Large DWMA Alternative & Small DWMA A Alternative	100	75	75	75	75	75	75	75	75	75	75	75	75	80	80	75	75	80	80	80	75	75	75	80	75	75	75	30	75	75	80
	Small DWMA B Alternative	100	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51

Appendix I
Science Panel Report

During the week of November 10 through November 12, 1998, a panel reviewed various aspects of the "science" which was being developed as the basis for plan analyses and decisions. The panel members are listed in the report below which was written by the panel in conclusion to its review. Specifically, the panel was asked to respond to a set of questions (in the report) about how well it felt the NECO plan was developing from a science point of view. The full text of the report is included here. The information provided has been used and referred to periodically by the planning team as a quality/process check and may also help the reader to understand some of the basis for the plan.

Report to the Northern and Eastern Colorado Desert Management
Richard Crowe, chair, BLM

Science Panel Review Committee
(Chair) Michael F. Allen, Center for Conservation Biology
James Reichman, National Center for Ecological Analysis and Synthesis
Oliver Ryder, Center for the Reproduction of Endangered Species
John Rotenberry, UCR-Natural Reserve System
Edith Allen, State of California Cooperative Extension

Acknowledgments
Fred Edwards, Center for Conservation Biology

Goal
To evaluate the Conservation Science that will be used to underpin the NECO plan.

Meeting times
Tuesday 10 November 1998 to Thursday 12 November 1998

NECO public scoping issues
1. Desert tortoise recovery
2. Management of other species
3. Designation of routes of travel –open, closed, limited
4. Land tenure adjustment
5. access to resources and red tape in getting use authorizations
6. Wild Burros along the Colorado river

Questions asked of the Panel to respond to
A. How well have we done and are there serious gaps in gathering and analyzing data: quality, completeness, substance, detail, accuracy, methods, and intended uses given the nature and scope of the decision that we need to make?
B. How well have se done in providing an ecosystem basis to planning - i.e., the incorporation of information about species, habitats, and ecological processes?
C. What conservation principles are suggested given the nature of values, issues, and the management situation and the need for alternative plans (or management solutions)?
D. Can the panel offer monitoring and research design and priorities insight, including siting research natural areas given the nature of the planning situation and the certainty of limited future funding?

Report of the panel

1. How well have we done to date in gathering and analyzing data?

The data on vertebrate species have been gathered is very good. Inevitably, some species and locations will be missed, but it is unlikely that more species distribution data will alter any important conclusions. The data are organized and summarized using GIS into well-presented GAP models for richness and important species. The key now is not to spend more time on distributions, but to concentrate on Ecosystem Processes (see below). Generally, we see no need to generate major new data layers, with two exceptions: the distribution of exotic species and the addition of a soils map. These relate to key processes, (see 3 below).

2. Can you recommend further short-term analyses or studies?

We define short-term data sets as those that can be generated in weeks to months. Most data gathering exercises will not result in more useful information at this time. There are many studies on behavior that can be extrapolated from other sites such that few short-term experiments will be particularly useful.

We do recommend that efforts be undertaken to combine data layers to better localize activities of concern. Examples can include:

- Development of point maps of tortoise locations
- Development of point maps for bighorn sheep sightings
- Overlay these with postulated habitat distributions.

From these, an understanding can develop of the real migration activity, and assess migration processes (e.g., dispersed versus corridor migration). The plan should include corridors for movement or if the animals are likely to percolate through the environment. The patterns of land protection will vary greatly depending on these patterns.

Secondly, we explicitly recommend more interagency communication for the plan development. This particularly includes:

- with the West Mojave, NEMO, Arizona Fish and Wildlife (for the tortoise) and Cal Fish and Game (for the sheep).
- with the various government entities in the region. This will help to overlay patterns of development with the distribution of organism protection.

A third analysis that should be undertaken is to evaluate the map scales especially for critical or listed species. In particular, different organisms require different scaling units. The feeding habitat of a species may have a very tight edge depending on topography or vegetation. However, its migration may be diffuse (with no well-defined edge) or may be along a specific corridor (which may have a well-defined edge). Understanding these patterns may be critical to placing different use patterns (see example - below). These will also help evaluate critical processes affecting species. For example, knowing the edges will allow one to determine what perturbations subdivide populations. A dirt road may not affect a hawk but will a tortoise if it is sharply graded.

Once those edges are determined, size frequency analyses using different polygon sizes of the distributions of key species can be determined. These will provide insights into how human activities are likely to affect individual populations.

An example is to assess fragmenting activities, such as roads, highways, canals etc. Do these intersect habitat polygons and how? Size frequency estimates of current populations will provide insights into the habitat

quality and persistence. The size frequency of polygons might also be used to develop a minimum population size analysis and a spatial prediction of sizes necessary to maintain those sizes. An example is two roads. One will cross through the middle of the habitat of a critical species. The second only goes along the edge. The first road divides the population into two metapopulations each with a lower survival probability. The second road may not have any effect.

Upon completion of these activities, roads that are redundant or crossing critical ranges should be eliminated or not built. Roads edging those same locations may be acceptable.

3 How well have we done in providing an ecosystem-based approach to planning?

Managers and ecologists often define ecosystem differently. In managerial approaches, an ecosystem approach is largely the management of larger areas and is habitat focused. For ecologists, an ecosystem is the interaction of organisms with their abiotic and biotic environment. It is a process-based discipline. From an ecosystem scientist's perspective, ecosystem processes are largely missing from this plan. A true ecosystem approach would be appropriate. This would allow processes such as migration, survival of droughts, woodland hydrology, sand movement, and climatology to be intimately incorporated into decision making. These are scale dependent.

While we do not recommend focusing on describing or modeling processes such as net primary production, nutrient cycling, many ecosystem processes directly relate to the biota and can form the basis of a management strategy.

Particular processes that should be evaluated are:

- Disturbance-These range in scale from the diggings of tortoises to disease, fire and climate change. These also include anthropogenic perturbations. Those human disturbances that are similar in space and time to natural disturbances may not have a major effect as organisms can adapt to these. Those outside of natural scales are likely to be devastating. For example, some mining activities and some roads may resemble flooding events. Increasing fuel loading coupled with increases in exotic weed seed brought in along some roads may result in fire, a widespread disturbance that these organisms are likely not adapted to.

- Disease-Diseases are devastating particularly to local wildlife. However, we know little of the dynamics of disease. Is this a naturally recurring process, or only recently introduced. Why and how does it spread?

4. What conservation principles can be used to guide selection and design of management zones?

There are important principles that can be used to guide work. However, these sometimes will be (or seem) contradictory. Existing guides and development of minimum population viability models could be helpful.

Fragmentation is clearly a critical process for this region. Agency scientists should review concepts related to fragmentation. Two issues stand out, however. On one hand, the bigger the reserve, the better. This comes from the knowledge that as a habitat is fragmented, the population is split. That makes both populations more susceptible to extinction. Thus, the larger the reserve for any critical species, the better.

Over the longer term, fragmentation also reduces gene flow. Genetic change is critical to the long-term survival of a species. As fragmentation splits populations, these can no longer exchange genes and retain the array of genetic material necessary to survive large-scale environmental change.

However, should one then make a single large reserve? The qualifier is that a single area is also more

susceptible to a single catastrophic event. A single hurricane or fire could devastate a single preserve. Further, a single reserve can serve to increase the incidence of the spread of disease. As both the bighorn sheep and the desert tortoise are affected by disease, maintaining multiple populations, some of which interact minimally, is also important. This is a function of finding and maintaining multiple sites where viable populations can be maintained.

We recommend careful evaluation of minimum viable population models and assessment of their applicability to the differing areas.

In this vein, many potential suitable habitats are found to be unoccupied. These are often deleted from consideration. However, many of these species exhibit metapopulation characteristics, that is, they exist in separated populations and only occasionally intermix. As one metapopulation becomes extirpated because of disease or catastrophic disturbance, another will eventually migrate to that location and re-establish a new metapopulation. Elimination of "unoccupied" habitats should be carefully considered.
The migration of critical species must be known. The importance of corridors must be considered and the possible species using corridors and the locations of those must be documented. That brings out the need for point distributions of sightings as opposed to polygon GAP-type analyses.

However, many species likely also do not move across the landscape in corridors, they simply diffuse across a landscape. Those individuals encountering obstacles largely die, and a few individuals may percolate across the hostile region. Knowing the migration pattern is essential to protecting migration routes and, if necessary restoring stopover locations.

Biodiversity is a topic that is widely touted. Use of GAP models is a common activity. The development of the GAP analysis was a valuable set of information. However, biodiversity *per se* is not necessarily the goal. It is the maintenance of critical species and of native organisms that make the ecosystem function in a predictable, desirable manner. The introduction of exotic species can increase diversity but, over a longer time, these species can alter nutrient cycling or standing dead material that facilitates detrimental processes, such as fire or increasing secondary compounds detrimental to the native animals.

These processes clearly demonstrate the need for an iterative reserve design. That is, upon placement of a suite of reserves, the populations need to be monitored and new locations protected or created as more data become known or change through time. This is classical adaptive management. Most models assume equilibrium conditions. However, we know that these ecosystems are not in equilibrium. Non-equilibrium successional models and metapopulation models must be incorporated into and adaptive management strategy.

We view restoration as an essential management concept. While it does not necessarily serve as a viable mitigation approach, it can become important for creating migration stopover points, or reconstructing habitats already destroyed. Further, in an adaptive management strategy, restoring some habitats in what are found to be critical areas will be essential for specific habitats. The mechanisms of restoration, using succession theory, in particular, initial succession models and restoring soil and hydrological functions will become essential. These areas can be expanded in future evaluations

5. How can we include flexibility?

An adaptive management strategy is absolutely critical to the plan. We recommend 2 specific steps:

- First, protect large areas including currently unoccupied habitats.
- Second, take an adaptive management approach; use management decisions as experiments.

Protecting as much existing habitat using current reserves and new lands, as they are available is important

to extant populations. However, it is crucial to remember that if these species are to be de-listed, they must increase, meaning must expand into currently unoccupied areas.

We strongly encourage having research scientists and managers partner in all reserve design, management strategies, and monitoring (we view this a long-term research). These data can be valuable in pointing directions for changes of management strategies and for formulating theory useful for future management decisions. This is useful for managers. Research scientists can provide input to making the sampling strategies that are statistically powerful thereby helping in planning and in developing new theory. For both, thresholds are poorly understood. These need to be addressed, prioritized, and utilized in future decisions both here and elsewhere.

This must include careful data collection, management, and archival of all monitoring data. Further, we recommend the following data sets in the monitoring schemes:
For tortoises:

- population structure. These must include life tables, with an age structure robust enough to develop models of population growth or decline.
- epidemiology. These must derive from the population structure models to assess if there are susceptible ages or conditions. These should be specifically addressed.

For bighorn sheep:

- population structure
- migration patterns

For habitats: monitoring must include not only "good" habitat. We understand little of the recovery of habitats in a successional or restoration context. However, if populations are to rebound, these relationships must be understood. We suggest that as mining operations end, or unnecessary roads are closed, that the operators, managers, and research scientists cooperatively develop recovery and monitoring plans to study success and failures (which are just as important to document as successes) of recovery plans. These should also incorporate appropriate frequency. Some parameters need annual monitoring, others shorter or longer. These need to be appropriately assessed.

Data management is essential. Information in not acceptable unless published in a peer-reviewed format. That is, it should stand to appropriate criticism.

Overall Concerns:

- Decision-making must become an iterative process. Science is not a one-time answer, as experiments and monitoring efforts occur, they generate new information that must be fed back into the management process. It is only through this approach that the value of science can truly be gained.
- Information gained must stand public scrutiny; that is, it should be published in a peer-review format.

Research and monitoring costs should be a part of doing business. It should focus not only on “pristine” sites, but also on potential recovery and devastated sites to evaluate the opportunities for restoration. After all, the goal is to de-list species, which requires more, not less habitat. Linking potential sites with the UCR-NRS would be a valuable approach for developing comparisons and in developing a data management program. The public, management agencies, local governments, and research scientists should interact in the process of plan development and in the continued monitoring and iterative management decisions. It is through this effort, public confidence can be improved, the management becomes scientifically based, and the theory necessary to manage these lands and others gained.

Appendix J
Guidelines for Domestic Sheep Management in Bighorn Sheep Habitats

The following is excerpted from Appendix C of *Mountain Sheep Ecosystem Management Strategy in the 11 Western States and Alaska.* U.S. Department of the Interior, Bureau of Land Management. 1995. Rept. BLM/SC/PL-95/00+6600. 79pp.

Guidelines for Domestic Sheep Management in Bighorn Sheep Habitats

The Bureau of Land Management desires progressive bighorn sheep management compatible with appropriate grazing on public lands by domestic sheep. It is recognized by State and Federal Agencies, bighorn sheep organizations, and the domestic sheep industry that:

A. There appears to be some diseases that are shared by domestic and bighorn sheep. There is evidence that if bighorn and domestic sheep are allowed to be in close contact, health problems and die-offs may occur. Some diseases may be transmitted between both species;
B. There are bighorn sheep die-offs that occur with no apparent relationship to contact with domestic sheep;
C. The above two observations are both valid and not mutually exclusive;
D. Bacterial pneumonia are not the only diseases of concern, although perhaps they are the most catastrophic;
E. The risks of disease transmission are often unknown; they may, however, be site specific, and;
F. Reasonable efforts must be made by domestic sheep permittees and wildlife and land management agencies to minimize the risk of disease transmission, and to optimize preventative medical and management procedures, to ensure healthy populations of bighorn sheep and domestic sheep.

In recognition of the above factors, the guidelines set forth below should be followed in current and future bighorn/domestic sheep use areas.

1. State wildlife and Federal land management agencies, bighorn interest groups, and domestic sheep industry cooperation and consultation are necessary to maintain and/or expand bighorn sheep numbers.
2. When agency and industry agreement has been reached to maintain and/or expand bighorn sheep numbers, the agencies and the domestic sheep industry will be held harmless in the event of disease impacting either bighorns or domestic sheep.
3. Domestic sheep grazing and trailing should be discouraged in the vicinity of bighorn sheep ranges.
4. Bighorn sheep and domestic sheep should be spatially separated to discourage the possibility of coming into physical contact with each other.
5. Buffer strips surrounding bighorn sheep habitat should be encouraged, except where topographic features or other barriers prevent physical contact between bighorn and domestic sheep. Buffer strips could range up to 9 miles (13.5 kilometers) depending upon local conditions and management options.
6. Domestic sheep should be closely managed and carefully herded where necessary to prevent them from staying into bighorn sheep areas.
7. Trailing of domestic sheep near or through occupied bighorn sheep ranges may be permitted when safeguards can be implemented to adequately prevent physical contact between bighorns and domestic sheep.
8. Unless a cooperative agreement has been reached to the contrary, bighorn sheep should only be reintroduced into areas where domestic sheep grazing is not permitted, and the allotment(s) in

which bighorns are to be introduced should not have been used for domestic sheep grazing for two or more years prior to the bighorn release.

9. In certain special circumstances, extraordinary precautions will be followed to protect federally listed threatened or endangered subspecies; State listed subspecies; Federal candidate subspecies; and BLM Category II populations (BLM Rangewide Plan for Managing Habitat of Desert Bighorn Sheep).

10. For desert bighorn sheep (*Ovis canadensis nelsoni, O.c. mexicana, and O.c. cremnobates*), the following additional guidelines are recommended:
    1. No domestic sheep grazing should be allowed within buffer strips less than 9 miles (13.5 kilometers) surrounding desert bighorn habitat, except where topographic features or other barriers prevent physical contact.
    2. Domestic sheep trailed and grazed outside 9 miles (13.5 kilometers) buffer and in the vicinity of desert bighorn ranges should be closely managed and carefully herded.
    3. Unless a cooperative agreement has been reached to the contrary, domestic sheep should be trucked rather than trailed, when trailing would bring domestic sheep closer than 9 miles (13.5 kilometers) to occupied desert bighorn sheep ranges, especially when domestic ewes are in estrus.

11. These guidelines will be reviewed every 3 years by a work group comprised of representatives from the livestock industry, State wildlife agencies, BLM and bighorn sheep organizations.

Appendix K
Johnson Valley to Parker Motorcycle Race EIS (1980)

The following information is a highlight of the event design and required mitigation from the indicated EIS.

1. One annual running in October or November sponsored by the Checkers Motorcycle Club of the American Motorcycle Association. The event originated in the 1950s and has been conducted on various alignments over the years.

2. Type of event: point to point, mass start.

3. Length: 235 miles total - from Johnson Valley Off-Highway Vehicle Recreation Area to finish east of Vidal Junction (178 miles on roads, 42 miles on old race alignment, 15 miles new disturbance).

4. Three alternative segments are noted. NECO includes the environmentally preferred alternative

5. Johnson Valley Off-Highway Vehicle Recreation Area Area contains the start area and first 20 miles of race so waves of riders "funnel" down to an acceptable width for remainder of alignment.

6. Start: 2 waves with 400 participants in each wave for a total of 800 participants.

7. 4 pits, each of about one acre or less at intervals of 40-50 miles. Access to pits is by highway and other non-race course roads.

8. Few spectators (and spectator issues) anticipated. All spectators are required to park and confine activities to defined areas and not engage in indiscriminate vehicle free-play.

9. Course width is 200 feet (100 feet either side of centerline), reduced for points/areas of sensitive resources to 10-25 feet in places. About 30 feet of the course width, including sections on roads, are most heavily used with reduced use and disturbance outboard from centerline.

10. Additional requirements not specified here include details about course marking of standard and sensitive areas, event administration, legal aspects of permitting, and safety.

11. Wet conditions: event must be canceled or postponed.

12. Sensitive areas: protected through routing, barriers, flagging, reduced speeds.

13. Rehabilitation: sponsor is required to grade roads and restore unacceptable damage.

14. Monitoring: required to assure anticipated execution and proper event administration, identify need for damage restoration.

Appendix L
Route Inventory Process

Each BLM field office was responsible for conducting an inventory of 100% of all routes within their respective boundaries. The objective was to complete an inventory of *routes*, not vehicle tracks. In some instances, there is not a clear distinction between a route and multiple sets of vehicle tracks, thereby necessitating "interpretation" of the circumstances while in the field. A determination as to whether the surface evidence of prior vehicle use is significant per definition of "existing" routes in the CDCA Plan, as amended, was required.

Also, many routes within the planning area that were established many years ago and have appeared on various maps no longer receive any apparent use as evidenced by the occurrence of substantial natural reclamation. Since the degree of natural reclamation varies from one location to another, the individual conducting the field inventory had to determine if the route was sufficiently visible such that it could be reasonably followed without destroying vegetation or deviating from the course. If not, the route would be considered as a "non-route" and would be noted as such during the inventory process.
"Non-routes" are defined as follows:

> Non-routes are previously-existing routes which have been substantially reclaimed by the forces of nature. Some of these non-routes are delineated as existing routes on the most recent versions of 1:24,000 U.S.G.S. maps. Nevertheless, an on-the-ground survey revealed that such routes (1) cannot be located due to complete or near-complete reclamation, (2) are intermittently visible thereby encouraging intermittent cross-country travel where evidence of the route disappears, and/or (3) have been revegetated to the extent that, although visible, travel upon them would require the crushing of substantial vegetation (destruction of natural features).

Although an attempt was made to inventory 100% of the routes within the NECO planning area, it is likely that some routes were overlooked. In addition, given the occasional interpretation required to distinguish multiple sets of vehicle tracks from legitimate routes of travel, or in ascertaining if natural reclamation has sufficiently obscured a route such that it is now considered a "non-route," not everyone may agree on the determination.

To ensure that the inventory reflects the existing situation, the public was requested in 1996 to review the route inventory maps and submit comments as to the completeness of the inventory. Opportunity to review the maps was afforded up to release of the draft NECO Plan. Few comments were received; based on those comments, some revisions to the route inventory occurred.

Route Inventory Process by Field Office

El Centro Field Office

The route inventory for the NECO Plan began with a series of maps that had been developed over the last 15 years as the El Centro Field Office worked on the route designation process; designation decisions were made over that period for a limited number of routes. With these maps in hand, a team of volunteers was sent to the field in 1995 to identify routes that had not been delineated. The newly-identified routes were digitally recorded with Geographic Positioning System (GPS) instrumentation and transferred into ARC/INFO, a software program for managing computerized spatial data. At the same time, routes appearing on previous versions of inventory maps were either recorded with GPS instrumentation by the field team or digitized by field office staff. The field team also surveyed these routes for present condition and location.

Routes that had disappeared due to lack of use were noted. Routes exhibiting changes to alignment due to wash shifts or erosion problems were "GPSed" and updated in ARC/INFO.

Subsequent to public review of the route inventory in 1996, additional field surveys in specific locations were undertaken in 1997 to augment the inventory with routes that had been overlooked during previous inventory efforts. In refining the inventory further, additional corrections were made in 1999 upon identification of "non-routes" previously ascertained as existing routes.

Palm Springs-South Coast Field Office

As in El Centro, the process of route inventory began prior to initiation of the NECO Plan. The previously-developed, but incomplete inventory was the basis for undertaking an intensified effort for the Plan. With the use of GPS instruments, the Palm Springs/South Coast Field Office staff took to the field to reevaluate existing route locations as well as augment the inventory upon discovery of unmapped routes. The GPS instruments were used to determine route locations through recordation of point coordinates directly onto maps--point data was not digitally stored in the GPS units for transfer to ARC/INFO. Based on field information, clean-copy route inventory maps at the 1:24,000 scale were developed. Route locations were digitized from these maps for incorporation into the data base.

Needles Field Office

Unlike the El Centro and Palm Springs/South Coast Field Offices, the Needles Field Office did not begin the NECO Plan route inventory effort with a base inventory other than as appears on U.S.G.S. quadrangles. In 1994, the inventory effort began with a full-time volunteer along with field office staff collecting route location data with GPS instruments. The objective was to drive every route within the planning area and digitally record their locations. "Non-routes" were digitized from maps at the 1:24,000 scale.

Appendix M
Artificial Water Sources for Bighorn Sheep, Deer, and Other Wildlife

Design, Installation, Operation/Maintenance

Traditionally, for the past 40 years or more, several designs of artificial waters have been used for both small and large animals with varying degrees of costs, effectiveness, and difficulties to operate and maintain. These include:

- Small animal "guzzlers" - primarily for upland game birds - utilize small area catchments that catch and direct rainwater that falls over a few hundred square feet of concrete or asphalt to a tank of a few hundred gallons. Many of these are still in place and operational. Due to small capacity, they tend to dry up in periods of drought. Most have been modified to prevent entrapment and death of the desert tortoise. Few if any of these have been built in the last 20 years.
- For large animals, primarily for bighorn sheep and desert mule deer, the standard design has been a complex of features: water flow catchment in a wash, a pipeline to a set of fiberglass tanks, and a valve-based drinker. These were usually built on the sides of mountains in rocky areas. They hold a few thousand gallons of water. Dozens of these were built and most are still operational. They require significant time and expense to maintain and rebuild. Helicopters are often required to build/rebuild. The valve means that there are moving parts which can fail, either rendering the water unavailable or draining all the water. Tanks have collapsed and killed sheep. These may also dry up in prolonged drought.
- Some windmills/troughs are in place. They also require considerable maintenance and, due to their high profile, are subject to vandalism. About nine are in the Sonoran Desert, are shallow in depth and have dried up in the last two years. These primarily provide water for large animals.
- In very rocky areas of the Sonoran Desert natural water catching/holding rock tanks (tenajas) have been modified with steps and dams to allow access for bighorn sheep and deer. Water capacity is usually limited. Helicopter water drops have been required in times of drought.
- In the last few years a new concept in design and placement of drinkers has been developed that is considerably advanced over the above: less expensive to install and maintain, water is available for all sizes of wildlife, several times more water storage capacity than any other design, and, being almost entirely underground, imposes the least visual intrusion possible. There are no moving parts. Large animals utilize steps to reach water, while small animals utilize a roughened straight-line ramp. This design (with slight variations for special situations) has been used exclusively in the Sonoran Desert for the last 10 years and is the standard design proposed in this Plan. . In this Plan this type will be referred to as the "Underground Drinker".

Underground Drinker

1. Design is shown in Figure M-1 and Photo M-1(complete drinker).

2. Location consideration
   - For Bighorn Sheep proposed new drinker locations are generally at the toe of mountain slopes for the following reasons: force sheep to travel through more area of forage to access water, ease of access, removal from wilderness areas as much as possible
   - For deer sites are proposed in deer habitat, normally below the elevation of wilderness areas
   - Table M-1shows the number of proposed drinkers in BLM wilderness areas

3. Water spacing
   - The number of waters proposed would introduce Bighorn Sheep and deer to the maximum amount of new forage which would achieve goals of increasing population number and viability
   - The basis for general spacing is that Bighorn Sheep and deer is recent research which indicates that the two species forage away form water to about three miles, depending upon the time of year.

4. Installation
   - Access is via existing roads or, much more common, navigable washes. In the latter case all vehicle tracks are brushed out upon completion and departure.
   - Duration of installation is two days.
   - Installation equipment involves two to three pick-up trucks, some hauling people and materials and one pulling a backhoe.
   - Installation disturbance area for the tank/drinker is 15' x 60', for the pipeline is about 50' x 2'. Tank entrance is not visible to the casual observer from more than 150', especially if placed behind shrubs/rocks/against a hill. "Artificial" rocks are built if tanks sits higher out of ground. A 6" x 15' dam of native rocks and concrete is also built across a wash swale (about 3'-10' wide) to catch and direct water. Nearly all facilities are below ground as shown in the drawing and photo. The tank entrance and dam are only features above ground or visible. All soil disturbance is brushed out as a final step.

5. Operation & Maintenance
   - Access and brush out are the same as for installation.
   - Duration of stay is a few minutes to hour to inspect and perform minor work. This design has required no major repairs or water hauling since installation at nearly all sites.
   - Frequency of visit is usually one visit per year.
   - Equipment usually consists of one 4x4 vehicle, an SUV or pick-up.

6. NEPA and tiering

   The Plan proposes a programmatic proposal for waters for the Sonoran Metapopulation with no installation priority distinction. (A proposal for new drinkers in the Southern Mojave Metapopulation will be made at a later date when CDFG initiates planning for this area. Waters have been generally located on 7 ½' USGS topographic maps and entered into GIS. Waters will receive 2 levels of NEPA review:
   - NECO includes analysis of general biological need/effects including effects on wilderness values
   - Waters will be built over a long period of time at the rate of about 4-6 per year receiving 2nd NEPA review the year of or prior to funds being requested/received. Subsequent NEPA review will tier from NECO and address specific siting and subjects such as visibility, wilderness, access route, vandalism, cultural values, and any deviation from approximate location and typical design, etc. Drinkers proposed any given year will represent the highest priority at the moment. On an annual basis all waters in a given metapopulation will be proposed and addressed in a NEPA document in one batch and include a verification of need as originally proposed in NECO. Verification will include population status, trend, results of monitoring, and how the proposal for that year would address/help the population.

Figure M -1 Underground Drinker

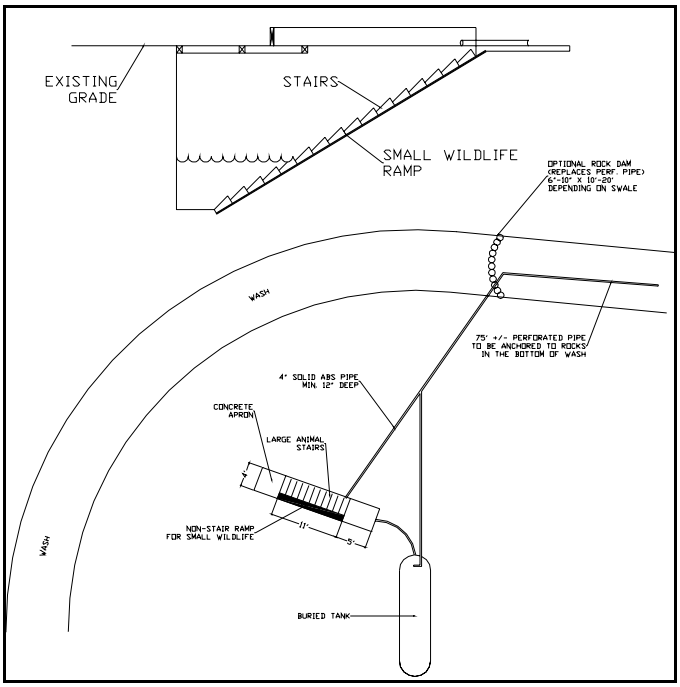

Figure M-2 Exclosure

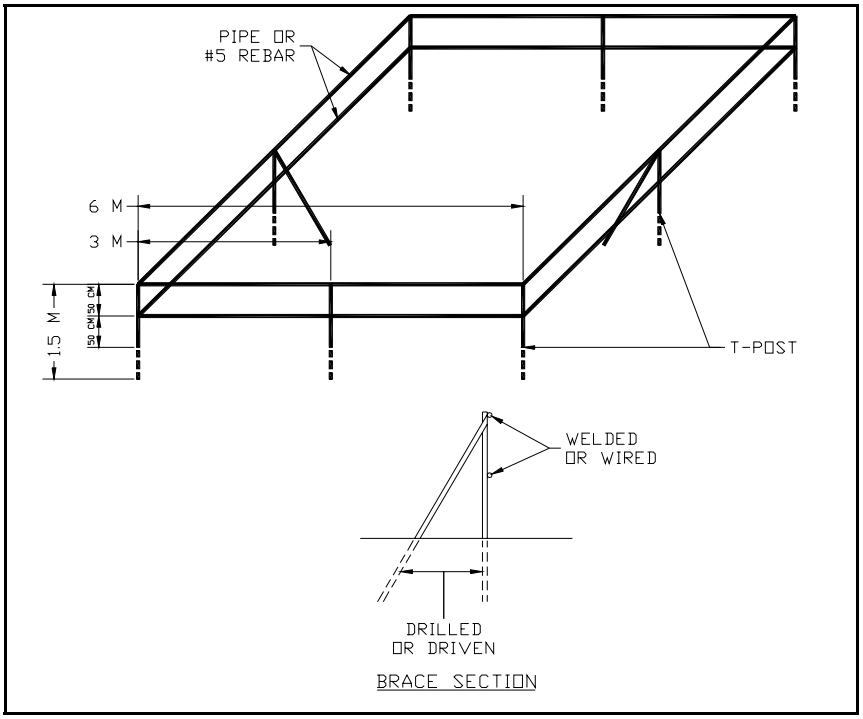

Table M-1

Wilderness Area	Number of Proposed Artificial Waters serving			
	Deer only	BH Sheep only	Deer/BHS	Total
Chuckwalla Mountains	0	2	3	5
Indian Pass	0	7	1	8
Little Chuckwalla Mountains	0	0	1	1
Little Picacho	0	2	1	3
Orocopia Mountains	0	4	0	4
Palo Verde Mountains	2	0	0	2
Picacho Peak	0	0	1	1
Total	2	15	7	24

Photo M-1 Underground Drinker (Sonoran Desert Plant Community Scrub).

Appendix N
Wildlife History and Wildlife/Plant Tables

The first part of this appendix contains life histories or species accounts for special status wildlife species. These descriptions provide additional information not included in Chapter 3. The second part is a set of management analysis tables for all special status species. These support various descriptive and affects analysis statements contained in Chapter 3 and 4.

Desert bighorn sheep (*Ovis canadensis* subspecies *nelsoni*)

Desert bighorn rams often reach 220 lbs and have large, thick, curved horns. Ewes weigh about 130 lbs and have slender, slightly curved horns. Their hooves have a hard outer edge and a spongy center that provides good traction even on sheer rock.

Desert bighorn sheep occur in small herds usually of about ten animals. They are active during the day, feeding in the early morning and late afternoon in steep, open habitats with low-growing vegetation. They prefer green, succulent grasses, forbs, and shrubs in varying proportions due to seasonal availability and species present.

In some studies, abundance and distribution were directly related to availability of free water. However, bighorn sheep may use moisture in forage or consume barrel cactus (*Ferocactus* spp.) when there is no access to surface water. The highest potential for water stress is during the hot, dry parts of the year from mid-June to mid-September.

The reproductive period, or rut, begins in June with most of the breeding occurring from July through September. Groups of ewes occupy a home range and are visited by traveling rams. Lambing occurs from January to April. Ewes usually seek out a precipitous slope with an unobstructed view and shelter to give birth.

Disease has been a major factor in bighorn subpopulation losses in some areas. Other impacts include competition for forage and water with burros and livestock, predation, and loss of critical lambing and foraging habitat.

Desert bighorn sheep is a BLM California Sensitive Species and a State Fully Protected Species and a Game Species.

Burro deer (*Odocoileus hemionus eremicus*)

Burro deer eat foliage from various riparian and microphyll woodland trees, such as willow, palo verde, and ironwood. Various other shrubs complete the diet depending on the season.

Major threats to burro deer are loss of habitat to agricultural development, urbanization, and tamarisk infestation along the Colorado River and, at least in the 1980's, drowning in the Coachella Canal.

Burro deer is a State Game Species.

Mountain Lion (*Felis concolor*)

Within the Planning Area mountain lion are restricted to the southern Colorado Desert from Joshua Tree National Park south and west to the Colorado River. They are found in very low numbers primarily in the mountains and wash systems in Imperial County. Burro deer, the primary prey, are known to spend the hot summer and fall in riparian areas along the Colorado River and in dense microphyll woodlands near the Coachella Canal. In winter and spring they move up major washes north from the Coachella Canal and west

from the Colorado River. Presumably mountain lions respond to these movements. It may be that mountain lions in the Planning Area are merely transient individuals wandering out of other areas and not part of a resident population of mountain lions.

Mountain lions are active year-round. They forage mostly at night and commonly seek daytime cover in caves and thickets. They are generally solitary animals, but young will stay with their mother until sometime in their second year. Males generally hold a large territory containing ranges of several females. Other, non-breeding males are transient over a wide area. Individuals may move seasonally in pursuit of their primary prey, which is deer. When available, they also eat other large mammals, such as burros, bighorn sheep, coyotes, rabbits, rodents, and skunks. Mountain lions apparently do not require drinking water.

Habitat fragmenting factors, such as Interstate Highways (especially Interstate 10) and aqueducts (especially the Coachella Canal), that affect the distribution and movements of burro deer are probably important to the distribution of mountain lions in the Planning Area. Deer populations along the Colorado River have declined as tamarisk has replaced native riparian vegetation; mountain lion numbers have probably declined with this primary prey.

The mountain lion in the Planning Area is sometimes referred to as Yuma puma (f.c. browni). Under that name it is a State Species of Special Concern.

California leaf-nosed bat (*Macrotus californicus*)

California leaf-nosed bats occur in the deserts of California, southern Nevada, Arizona and south to northwestern Mexico. In California, they are now found primarily in the mountain ranges bordering the Colorado River Basin, with some records occurring as far west as the Eagle Mountains. In California, surveys showed about 20 maternity colonies and about the same number of winter roosts (Map 3-4c Appendix A). The two largest roosts (each sheltering 1500 bats in winter) are in mines in extreme southeastern California. Almost all known roosts are in warm mines.

California leaf-nosed bats occur in lowland desert habitat in California in close proximity to desert wash vegetation. They are dependent on either caves or mines for roosting habitat. All major maternity, mating, and overwintering sites are in mines or caves.

Due to restrictive temperature requirements, California leaf-nosed bats seek out mines that provide roost temperatures of approximately 80˚F. In the Colorado River Basin, all known winter roosts are in geothermally-heated mine workings, and the areas used by the bats may be over a half-mile underground.

California leaf-nosed bats can be distinguished from all other western bat species by a combination of large ears, grey pelage, and an erect, leaflike projection from the tip of the nose. They forage primarily in desert washes, generally within one to three miles of the roost. They feed primarily on diurnal insects, such as moths, butterflies, grasshoppers, and katydids which they glean off surfaces. Although they can echolocate, they appear to forage utilizing hearing and vision. They do not drink water.

Females congregate in large (usually 100-300 bats) maternity colonies in the spring and summer. Within the larger colonies, clusters of five to 25 females will be associated with a single male that defends the cluster against intruding males. Large male roosts may also form. The single young is born between mid-May and early July. Maternity colonies disband once the young are independent in late summer. In the fall, males aggregate in display roosts and attempt to attract females. They do not hibernate or migrate.

The primary factors responsible for the declines are roost disturbance, the closure of mines for renewed mining and hazard abatement, and the destruction of foraging habitat. The combination of limited distribution, restrictive roosting requirements, and the tendency to form large, but relatively few colonies

make this species especially vulnerable.

California leaf-nosed bat is a State Species of Special Concern.

Occult little brown bat (*Myotis lucifugus* subspecies *occultus*)

Occult little brown bat is a medium-sized myotis that is difficult to distinguish from other *Myotis* species. In California, they are associated with desert riparian vegetation along the Colorado River. Females form large maternity roosts. Although males have been found associated with colonies in late summer, they are not present when the females are rearing a single young. They forage close to water and riparian vegetation, primarily on flies, moths, beetles, bugs, and other small flying insects.

They have a relatively limited distribution from the southwestern United States to central Mexico. In California, they are known from only a few localities along the Colorado River between Needles and Yuma (Map 3-4c Appendix A). The only maternity colony in California was located under a bridge near Blythe until 1945 when the bridge was demolished. It was the largest maternity colony ever known for this species. The species has not been seen in California since 1969. Occult little brown bats are probably extirpated from California, even though the species is the most common bat in the U.S.

In addition to destruction of its major roost site in California, the loss of riparian vegetation to agriculture and tamarisk along the Colorado River may also be a factor in the species' decline.

Occult little brown bat is a State Species of Special Concern.

Cave myotis (*Myotis velifer*)

Cave myotises are relatively large bats that occupy desert scrub, desert succulent shrub, microphyll woodland, and desert riparian habitats along the Colorado River (Map 3-4c Appendix A). They roost primarily in caves and mines but have also been found in buildings and under bridges. They tolerate high summer roost temperatures. The humidity in the caves is always high and often there is standing or running water present. They form large colonies in excess of 1000 individuals. Mating occurs in the fall and winter with a single young being born in June or July. Migrating out of the area during winter, the cave myotis appears to return to the same summer roost sites year after year.

Cave myotis feed on a variety of flying insects with a large portion of their diet consisting of moths and beetles. They forage over open water close to riparian vegetation in the Colorado River floodplain. They may fly considerable distances to feeding areas. Water for drinking is required.

Most historic records in California are from abandoned mines in the Riverside Mountains. The mines that once housed these large colonies no longer have them. Up to the 1950's, very large colonies were present in these mines from early April through August. Despite extensive survey work in the Planning Area over the past 25-30 years, there are currently only two known maternity roosts for cave myotis along the Colorado River: one with approximately 300 animals, and the other about 200. A mine in the Cargo Muchacho Mountains and a mine in the Riverside Mountains have large deposits of cave myotis guano, but surveys in 1993 showed none and few bats, respectively, at these sites.

The loss of extensive native vegetation to agriculture and tamarisk along the Colorado River may explain the dramatic declines of this species in California. The use of pesticides in the agricultural areas could have reduced the prey base and/or poisoned the bats.

Cave myotis is a State Species of Special Concern.

Fringed myotis (*Myotis thysanodes*)

Fringed myotises are widespread in much of the West. They occur irregularly throughout the State primarily in pinyon-juniper woodlands, coniferous forests, and oak woodlands, except in the Central Valley and the deserts, where it is known from only a few places. In the Planning Area, only two roosts in the Old Woman Mountains have been found; one of these is a significant maternity roost (Map 3-4d Appendix A).

Fringed myotises are named for a row of stiff hairs along the bottom of the interfemoral membrane. They roost in caves, mines, buildings, and crevices. They eat primarily beetles, but also moths, spiders, and grasshoppers foraging mostly at night over open habitats or over streams, lakes, or ponds. Foraging flight is slow, and they may use wings and tail membranes to capture their prey. They require drinking water.

Maternity colonies form in the spring in caves, mines, or crevices. A single young is born in the late spring or summer. In the fall, they may migrate a short distance to a suitable winter hibernaculum.

Closure of mines could disturb the few desert sites known for the species. They are easily disturbed at roosting sites.

Fringed myotis has no special status.

Pallid bat (*Antrozous pallidus*)

Pallid bats are known from Cuba, Mexico, and throughout the southwestern and western United States (Map 3-4b Appendix A). Population trends are not well known, but there are indications of decline. Urbanization, destruction of old buildings, disturbance in caves and old mines, and eradication as a pest are threats to the species.

Pallid bats are a large, long-eared bat readily distinguished from all other California bats by a combination of large size, large eyes, large ears, light tan coloration, a pig-like snout, and a distinctive skunk-like odor. Pallid bats occur in a number of habitats, including coniferous forests, nonconiferous woodlands, brushy terrain, rocky canyons, open farm land, and deserts. They roost primarily in rock crevices, but commonly in old buildings, under bridges, in caves and old mines, and in hollow trees.

Pallid bats are intolerant of roost temperatures above 40^{o} C, and they often occupy roosts that offer a varied temperature regime. They are very sensitive to disturbance at the roost, and upon disturbance they will generally retreat or abandon the roost. Nevertheless, their loyalty to a chosen roost (particularly buildings, mines, and bridges) is generally high.

Pallid bats forage primarily on large arthropods caught on the ground or gleaned off vegetation. Between foraging bouts, pallid bats congregate in night roosts in mines, buildings, and under bridges.

Typical maternity colonies contain 30-70 animals, although colonies of several hundred have been found. Colonies form in the spring (March-May) and stay together until October. Females give birth to one or two young in early summer. They are not known to migrate, but presumably spend the winter hibernating close to their summer roosts.

Pallid bat is a State Species of Special Concern.

Townsend's big-eared bat (*Plecotus townsendii*)

Townsend's big-eared bats are distributed throughout the western United States. Recent surveys show marked population declines for this species in many areas of California (Map 3-4b Appendix A). A combination of restrictive roost requirements and intolerance of roost disturbance or destruction has been primarily responsible for population declines of Townsend's big-eared bats in most areas. The tendency for

this species to roost in highly visible clusters on open surfaces, near roost entrances, makes them highly vulnerable to disturbance. Roost loss in California has usually been linked directly to human activity (e.g., demolition, renewed mining, entrance closure, human-induced fire, renovation, or roost disturbance). The loss of foraging habitat is also a probable factor in declines of populations in along the Colorado River, where the native floodplain community has been lost to agriculture and tamarisk infestation.

Townsend's big-eared bats are a medium-sized bat distinguishable by the combination of a two-pronged, horseshoe-shaped lump on the nose and large, rabbit-like ears. They occur in a wide range of habitats, but population concentrations occur in areas with substantial cavity forming rock (e.g., limestone, sandstone, gypsum or volcanic) and in old mining districts. They will also roost in old buildings, in tunnels, and under bridges.

Townsend's big-eared bats feed primarily on medium sized moths, but also consume other insects, such as beetles and flies. The proximity of good foraging habitat appears to be a determining factor in roost selection. In a recent survey in the Panamint Mountains, mines with suitable temperatures were occupied by maternity colonies only within 2 miles of a canyon with water.

Big-eared bats form maternity colonies in the spring varying in size from a dozen to several hundred animals. During this period, the females create densely-packed clusters (100 bats in a one-foot circle). Maternity clusters are always situated on open surfaces, often in raises in the ceiling just inside the roost entrance where warm outside air is trapped. Single pups are born between May and July. In the winter, cooler temperatures are required for hibernation sites, and the bats may move a short distance to caves or mines at higher elevations. In desert areas, old mines may contain from one to several dozen individuals.

Townsend's big-eared bat is a State Species of Special Concern.

Pocketed free-tailed bat (*Tadarida femorosaccus*)

Despite only a limited number of records, pocketed free-tailed bats are known to occur in the desert from March through August, when they then migrate out of the area. They have an uneven distribution in the southwestern United States and Mexico. In California, they are found primarily in creosote bush and chaparral habitats in proximity to granite boulders, cliffs, or rocky canyons. Recent observations in California show that this species occurs at only isolated locations in the southern third of the State (Map 3-4b Appendix A).

Pocketed free-tailed bats tails extends beyond the edge of the interfemoral membrane. They roost primarily in crevices but occasionally in caves and old buildings and feed primarily on large moths, but will also consume crickets, grasshoppers, flying ants, beetles, froghoppers, and leafhoppers..

Rockclimbing and pesticide spraying may be threats, but specific information is lacking.

Pallid bat is a State Species of Special Concern.

Western mastiff bat (*Eumops perotis*)

Historical records for the western mastiff bat were primarily in southern California between the Colorado River to the coast, but populations are now known to occur throughout the State (Map 3-4b Appendix A). Current population trends are not known. They are found in a variety of plant communities, but they roost in cliff faces of granite, sandstone, or basalt. Unlike most other North American bat species that mate in the fall, free-tailed bats breed in the spring and give birth to a single young in early to mid-summer. Colonies generally contain fewer than 100 individuals, and, unlike other North American bats, adult males and females may roost together at all times of the year. They move relatively short distances seasonally, but do not undergo prolonged hibernation.

Western mastiff bats have a free tail extending beyond the edge of the interfemoral membrane and large bonnet-like ears extending forward over the eyes. With a two-foot wingspan, they are the largest bats in California.

In California, western mastiff bats feed primarily on moths, but also eat beetles and crickets. They have been observed foraging at all hours of the day and up to 1,000 feet above the ground. They are strong, fast fliers and can cover an extensive foraging area in an evening. The species has been heard in open desert, at least 15 miles from the nearest possible roosting site.

Potential threats to the roosting and foraging habitat of western mastiff bats include urban expansion, rockclimbing, blasting, vandalism, extermination for pest control, and pesticide spraying. These large, noisy bats are vulnerable to the hysteria which often surrounds bat colonies.

Western mastiff bat is a State Species of Special Concern.

Colorado Valley Woodrat (*Neotoma albigula venustra*)

The range of Colorado Valley woodrat is from southern Nevada, southeastern California, northeastern Baja California, to western Arizona (Map 3-4c Appendix A). Historically, the range of the Colorado Valley woodrat appears to have changed little, even though portions of the range are lost to agriculture and urban development.

Colorado Valley woodrats (California subspecies of White-throated woodrat) are found in a variety of habitats including low desert, pinyon-juniper woodlands, and desert-transition chaparral. Areas such as washes where organic debris gathers are particularly attractive. They are often found where prickly pear cactus and mesquite occur. In rocky areas, they prefer using crevices in boulders for cover and nest sites.

In the hottest part of the year, water-rich cacti constitute 90% of the diet, even though it is toxic to most mammals. In areas with few cacti, Mojave yucca and then juniper are the most important food sources.

Colorado Valley woodrats are active at night, and during the day they retire into rock crevices or nests made from a variety of materials including cholla, sticks, remains of cactus fruits, bones, leaves, and trash. Nests are used for raising young, food storage, protection from predators, resting, protection from extreme weather, and sleeping. Successive generations may inhabit the same nest. When rock crevices are used for the nest site the woodrat places sticks, cacti and other objects in the fissure and runways. Dens are occupied by many species of arthropods, such as moths, crickets, bugs, harvestmen, and spiders, and a variety of animals, such as desert banded gecko, side-blotched lizard, zebra-tailed lizard, shrews, mice, and rabbits. Runways radiate from the nest and are often lined with cholla joints.

Timing of breeding varies geographically. Litter size is usually two, with a maximum of three young. They are active year-round and have no seasonal movements. They are solitary, occupy one den, and do not have territories. They are preyed upon by owls, coyotes, foxes, and snakes.

The most important threats are the loss of habitat and reduction in habitat quality by removal of nest material such as cactus and woodland. Habitat quality could be reduced by fires or conversion to exotic annuals.

The Colorado Valley woodrat is a State Species of Special Concern.

Mountain Plover (*Charadrius montanus*)

Mountain plovers do not breed in California, but they winter from northern California south to north-central Mexico and east to central Texas. In California they are found in the Central Valley, Antelope Valley, San Jacinto Valley, Imperial Valley, and Palo Verde Valley (Map 3-4d Appendix A). They begin to arrive on

their wintering grounds in southern California in October. On their wintering grounds plovers forage for ground insects in loose flocks ranging from 2 to over 1,000 birds. Individuals change flocks and foraging areas frequently during the winter. Mountain plovers run or freeze from perceived harm rather than fly. Most individuals head northward between mid-February to mid-March. Migratory routes are unknown.

Mountain plovers are a medium-sized shorebirds with undistinguished plumage. Mountain plovers inhabit grasslands, alkali shrubland, and, especially in and near the Planning Area, freshly plowed, burned, or harvested agricultural fields. They favor habitats that have been burned or grazed areas and have abundant mammalian burrows and soils that are heavy, saline/alkaline, clays.

The breeding distribution is contracting, and the total population is reportedly down 63 percent since 1966. Population declines are probably not due to losses on the wintering grounds as some studies have shown that overwintering survival rates are high and the species is adaptable to non-native habitats.

The Mountain Plover is proposed for Federal listing as an endangered species.

Golden eagle (*Aquila chrysaetos*)

Golden eagles are the largest raptor in the Planning Area. They forage over rolling foothills and valleys and nest on cliffs in mountainous terrain (Map 3-4e Appendix A). Golden Eagles are found throughout North America. They are uncommon, permanent residents throughout the State, but they are most common in Southern California. In the NECO Planning Area only a few eyries are known.

They eat mostly rabbits, hares, and rodents, but they occasionally take snakes and other vertebrates as opportunity arises. They need open grassland or low shrub-land for foraging. They hunt by soaring, perching, or quartering during the day.

Some golden eagles migrate through the NECO Planning Area in Spring and Fall. Some may winter in and near mountains. A few nest in the NECO Planning Area. Nests, referred to as eyries, are usually on secluded cliffs with overhanging ledges. The large platform of sticks at the eyrie may be used for many years. Usually two young are raised in late spring and early summer.

The major threat is disturbance at the eyrie, especially in the early stages of nesting.

Golden eagle is a State Species of Special Concern and is protected by the Bald Eagle Protection Act.

Ferruginous hawk (*Buteo regalis*)

Ferruginous hawks do not breed in California. They migrate from their breeding grounds in the plains of Canada and the U. S. south to wintering grounds in eastern Colorado and western Kansas to southern Texas. They winter in very low numbers throughout the West. They are known to migrate through California in September and April. They overwinter in very small numbers from mid-October to mid-March in the lower Colorado River Valley , Yuha Basin, West Mesa, and the agricultural areas of Imperial Valley (Map 3-4e Appendix A).

Ferruginous hawks are large, broad-winged raptors. They are usually found in grasslands or sparse brushlands and use high, lone trees and powerpoles for perching. In winter they are found in desert scrub, the fringes of pinyon-juniper woodlands, grasslands, pastures, fallow winter croplands, and playas.

Ferruginous hawks hunt from high perches or by flying low over open terrain. They spend more time on the ground foraging than other hawks. They eat mostly small mammals, particularly rabbits and hares, ground squirrels, and mice, but also some birds, reptiles and insects.

Ferruginous hawk is a State Species of Special Concern.

Prairie Falcon (*Falco mexicanus*)

Prairie falcons breed throughout the arid West from southern Canada to central Mexico. The overall distribution appears to be stable. In the 1970's 35 eyries were found within the California Desert District with approximately 12 in the Planning Area. It is unknown whether these eyries are currently occupied.

Prairie falcons are uncommon residents and migrants of open grassland, savannah, and desert scrub habitats. They are found in areas of the dry interior where cliffs provide secure nesting sites. In the desert they are found in all vegetation types, though sparse vegetation provides the best foraging habitat (Map 3-4d Appendix A).

They prey mostly on small mammals, birds, and reptiles hunting mostly in the early morning and late afternoon except when feeding nestlings or when prey is scarce. During the nesting season, they typically forage within 6 miles of the nest.

The pair arrives on the territory by March. Typically the nest site or *eyrie* is on a sheer cliff with an overhanging ledge and a broad vista overlooking a hunting area. Nestlings hatch by early May and fledge by mid-June. The young begin to disperse in June and July and by early August fledglings have moved to wintering grounds. Within the Planning Area it is not known to what extent they move seasonally, but wintering populations in the Planning Area are larger than breeding populations.

Historic impacts have included eggshell thinning from pesticide residues, conversion of habitat to agriculture, robbing of eyries by falconers, and shooting.

Prairie falcon is a State Species of Special Concern.

Elf owl (*Micrathene whitneyi*)

The elf owl breeding range extends from southwestern California east to Texas and south into Mexico. Historically, the elf owl was found along the lower Colorado River and at oases as far west as Cottonwood Springs in Joshua Tree National Park (1940-1970) and Corn Spring (latest in 1994) in the Chuckwalla Mountains. Currently, its California range is only along the Colorado River from just north of Needles to Imperial Dam. Most of the suitable riparian habitat has been cleared for agriculture or lost to tamarisk since the mid-1970's.

Elf owls migrate from Mexico in the spring, arriving on their nesting territories in mid-March. Eggs are laid in May and early June with a clutch size of usually three eggs. The male feeds the female from the time of pair formation, at the end of March, until the young are half-grown. In August, they leave for the wintering grounds in Mexico.

Elf owls are very small, measuring only 5-6 inches tall. They are very rare in California and occur only in spring and summer along the Colorado River Valley (Map 3-4d Appendix A).

Elf owls are found at springs and riparian thickets where there is moderately tall, old and decaying cottonwood, mesquite, and willow trees and in saguaro. Elf owls are absent in tamarisk thickets that now predominate along the Colorado River. They nest only in tree cavities excavated by woodpeckers (commonly Gila woodpeckers and ladder-backed woodpeckers in California).

Elf owls prey primarily on large arthropods, such as moths, crickets, beetles, and scorpions and occasionally small lizards and snakes. Elf owls hunt at night from a perch or by hovering over the ground. Perches are located over open vegetation or grassland and are usually moderately-tall cottonwood, sycamore, willow,

mesquite, or saguaro.

Elf owls are probably limited by nest site availability and may be out-competed by the introduced European starling for nest cavities. Starlings are highly aggressive and are known to evict other species from their nests. It has been hypothesized that more than one pair of elf owls may be needed in a subpopulation to mob predators or nest competitors.

The loss of mature, riparian habitat is the most important reason for this species' decline. Habitat loss has consisted of clearing and flooding for agriculture and water management and invasion by tamarisk. Frequent fires have also reduced suitable habitat and increased tamarisk.

The elf owl is State-listed as an endangered species.

Burrowing owl (*Speotyto cunicularia*)

Burrowing owls range from Texas west to California and from southern Canada south into Mexico. In northern climates they migrate south into the area in the winter. Burrowing owls were formerly common throughout much of California prior to the 1940's, but populations in central and southern California have declined in many areas due to agricultural development and urbanization. Little is know of the status of the burrowing owl in the California desert. Concentrations probably occur in agricultural drainage ditches of the Planning Area, just as they do throughout the Imperial and Coachella Valleys (Map 3-4e Appendix A).

Breeding begins in early March and ends in August. Burrowing owls are one of the few terrestrial birds to use the burrows of mammals for their nests, even though they are capable of digging. They will also use rock crevices, pipes, culverts, and nest boxes when burrows are scarce. Pairs may stay together during an entire year hatching clutches averaging about five young. After the breeding season, secondary burrows may be used for cover and roost sites. During the winter, attachment to a particular burrow is reduced even more. Resident birds in the Planning Area probably stay year-round.

Burrowing owls are long-legged owls standing about 8 inches tall. They are active during the day and inhabit open, level landscapes, such as dry grasslands, deserts, sparse shrub-lands, and farmlands.

Burrowing owls feed mostly on insects and scorpions, but they also eat small mammals, lizards, birds, and carrion. They forage at dawn and dusk, and during the summer they will hunt at night. They may hunt from a perch, hover, hawk, dive, or hop after prey.

Threats to burrowing owls are habitat conversion and destruction of ground squirrel burrows. Other threats may be accumulated pesticides, direct mortality from ground squirrel poisons, roadside shooting, and burrow destruction from canal and road maintenance.

The burrowing owl is a State Species of Special Concern and a USFWS Sensitive Species.

Gila woodpecker (*Melanerpes uropygialis*)

Gila woodpeckers range from the extreme southeast of California through Arizona south into western Mexico. They were formerly found along the entire lower Colorado River and in cottonwood groves in Imperial Valley. Now the species is found only at scattered locations along the Colorado River from Needles to Yuma, and they have disappeared in the Imperial Valley, except for a few pairs in Brawley. Within the Planning Area, Gila woodpeckers were known to occur in desert riparian washes (microphyll woodland) extending from the Colorado River as far as one mile away, but they are currently known only from scattered groups on the riparian corridor of the Colorado River (Map 3-4d Appendix A). They are more widespread in Arizona.

Gila woodpeckers are large, very active, noisy birds. They are found in desert riparian and desert wash habitats; in particular, they prefer cottonwood-willow riparian, saguaro woodlands, and mesquite woodlands.

Gila woodpeckers are opportunistic omnivores. They have been recorded eating insects, mistletoe berries, cactus fruits, galls, bird eggs, and acorns. They will also forage at bird feeders and garbage dumps. They usually forage by gleaning from trunks and branches of trees.

Their breeding season begins in late March with a peak in April and lasts until July. Pairs are monogamous and may produce two broods in a year. They excavate nest cavities in trees, such as cottonwood, willow, mesquite, as well as saguaro. Nests, which are reused each spring, are vigorously defended against interlopers such as elf owls, cactus wrens, flycatchers, kestrels, and starlings. They maintain spare cavities for roosting during the heat of summer. They are year-round residents.

Major threats to Gila woodpecker are loss of habitat to agricultural development, urbanization, and tamarisk infestation and competition with European starling for nest sites.

The Gila woodpecker is State-listed as an Endangered Species.

Vermilion flycatcher (*Pyrocephalus rubinus*)

Vermilion flycatchers are small flycatchers with the male having a brilliant vermilion-colored front and head. They live in large riparian areas with a high canopy and grassland under-story. They are sometimes found in parks and golf courses that have this same structure.

They typically perch on outer branches of trees or shrubs or tall herb stalks waiting for insects to fly by and then sallying out to catch them in mid-air. They frequently perch above water. Their diet consists almost entirely of flying insects.

Vermilion flycatchers are monogamous, and both parents care for the young. They build a cup nest at mid-story below the canopy. In the Planning Area, they nest regularly at Lake Tamarisk golf course and the residential area at Iron Mountain Pumping Plant (Map 3-4d Appendix A). Just outside the Planning Area, they nest in Covington Park in Morongo Valley and along the Colorado River near Blythe. They have been largely extirpated from former breeding areas in the Imperial and Coachella Valleys.

Habitat loss is the primary reason for declines in California. Nest parasitism by cowbirds may be a factor, also.

Vermilion flycatcher is a State Species of Special Concern.

Willow flycatcher (*Empidonax traillii*) and Southwestern willow flycatcher (*Empidonax traillii extimis*)

Willow flycatchers are found throughout most of the U.S. The southwestern subspecies nests in southern California, Arizona, New Mexico, western Texas, and northwestern Mexico. Little is known about migration or wintering in the NECO Planning Area.

Willow flycatchers nest in thickets in riparian habitats with willows, arrowweed, baccharis, or tamarisk; they are not known to nest in the NECO Planning Area. They probably migrate through the Planning Area in small numbers to and from nesting areas in the Sierras. If so, they probably rest at springs and seeps or other riparian areas in the desert. Some willow flycatchers spend the winter in the Imperial Valley and perhaps also in the NECO Planning Area. It is not known which, if any, of the subspecies migrates through or winters in the desert.

Willow flycatchers are a small, rare, insectivorous bird of riparian woodlands. There are four subspecies in the U.S. The species is difficult to identify, so records may not reflect its actual abundance.

Willow flycatchers capture flying insects by making short sallies from an exposed perch. They typically forage in willow thickets or adjacent wetlands or riparian habitat, but today they are relegated to marginal riparian areas with exotic plants as dominants.

Southwestern willow flycatchers have declined precipitously throughout the southwest. Major causes for decline are the loss of riparian habitat to urbanization, agriculture, and tamarisk infestation. On the breeding grounds, brood parasitism by cowbirds is common.

The Southwestern willow flycatcher is a federally Endangered Species, and the willow flycatcher is a State-listed Endangered Species.

Bendire's Thrasher (*Toxostoma bendirei*)

Bendire's thrashers arrive in the breeding area from late March to early April. Some leave the breeding grounds by the end of July with others departing through August. They migrate to southern Arizona, southwestern New Mexico, or Mexico for the winter. Wintering individuals have also been observed at the Salton Sea, coastal California, Bard, and Lancaster.

The largest breeding area in California lies just east of Essex from the south side of the Piute Mountains to the center of the Old Woman mountains. It is disjunct from another large breeding area near Cima Dome. The Essex population area lacks Joshua trees, but has dense stands of Mojave yucca and other succulents. There are a few records of Bendire's thrashers from JTNP in the Planning Area.

Bendire's thrashers are medium-sized, migratory songbirds. They are highly localized in desert succulent scrub (especially yuccas, Joshua trees, and columnar cholla) or microphyll woodland with palo verde trees (Map 3-4e Appendix A). Firm, moderately compacted soils (not sandy or rocky) may be an important habitat factor. When startled, Bendire's thrashers flee by flying rather than running for cover as other thrashers do. When they do seek cover, they head for stands of thorny shrubs and cactus.

Bendire's thrashers feed primarily on the ground where they use their bill to peck, probe, and hammer in the soil. The diet is mainly insects and other arthropods, but they will also eat seeds and berries.

Bendire's thrasher is a State Species of Special Concern.

Crissal Thrasher (*Toxostoma crissale*)

Crissal thrashers occur from southwestern Utah, southern Nevada, and southeastern California east to southern New Mexico and southwestern Texas and south into Sonora. They are found along the Colorado River Valley, but elsewhere in California populations are highly local and uncommon (Map 3-4e Appendix A). Crissal thrashers are also found in Milpitas Wash, Indian Wash, and Chuckwalla Bench and in the Chuckwalla Dune Thicket. Inventory data elsewhere are scant. Agricultural and urban development have greatly reduced the distribution in the Coachella and Imperial Valleys.

Crissal thrashers begin breeding activities as early as December, but nesting occurs primarily between February and June. Pairs mate for life and hold their territory year-round. They typically raise two broods in a year, and small family groups may be seen later in the year.

Crissal thrashers are medium-sized, resident songbirds. They occur along streams, rivers, and washes in dense thickets of mesquite, ironwood, catclaw acacia, arrowweed, and willow. Loose soils (not too firm or sandy) suitable for digging up insect prey may be a strong habitat factor.

Crissal thrashers forage on the ground under deep cover. They eat mostly insects, but will also eat snails, small vertebrates, and fruits. They use their long, strongly decurved bill to dig in the soil and to probe the litter for food. This is the shyest of desert thrasher species, and they typically run for cover.

Agricultural development, urbanization, and tamarisk invasion have greatly reduced numbers. The species is highly vulnerable to noise and other disturbances. Crissal thrashers can be parasitized by brown-headed cowbirds, but they will eject cowbird eggs from their nests.

Crissal thrasher is a State Species of Special Concern.

LeConte's Thrasher (*Toxostoma lecontei*)

Le Conte's thrashers are distributed from the Mojave Desert east into southern Utah and northern Arizona, and south into northern Mexico. A disjunct population occurred in the San Joaquin Valley, but most of that range has been lost to agricultural and urban development. Le Conte's thrashers are distributed throughout the Planning Area, but many areas with suitable habitat are unoccupied (Map 3-4e Appendix A).

Le Conte's thrashers are medium-sized, resident songbirds. They inhabit desert flats, washes, sandy alluvial fans, and open shrub-land with alkaline soils. Preferred habitat generally has cholla and saltbush, and there may be associations of creosote bush or Joshua tree. Landscapes are often flat or gently sloping.

Breeding activity begins in late January and continues into early June, with a peak from mid-March to mid-April. They are territorial, and the male actively pursues intruders. Preferred nest sites are in cholla or saltbush. Both sexes incubate and tend the young. They may produce three broods in some years. When startled Le Conte's thrashers run for cover. They are very wary of human presence.

Le Conte's thrashers feed on a variety of insects and other arthropods and occasionally on seeds and small vertebrates. The bulk of its diet is beetles, caterpillars, scorpions, and spiders. They mostly forage on the ground by probing and digging in the soil and litter with their long, strongly decurved bill.

LeConte's thrasher is a State Species of Special Concern.

Yellow warbler (*Dendroica petechia*)

Yellow warblers formerly nested in the Colorado River Valley, but they no longer breed there or elsewhere in the Planning Area. They migrate commonly through the Planning Area near the end of March through mid-April and again in September and October (Map 3-4e Appendix A). These migrants will stop at any size woodland or oases. Regularly spaced woodlands and oasis with open water for drinking are essential for migrants. A few yellow warblers spend the winter in the Planning Area. Found throughout the U.S., populations in the West have experienced severe declines. For example, they have been totally extirpated from the California side of the Colorado River Valley.

Yellow warblers are small, bright yellow, neotropical migrant songbirds. In the desert southwest, yellow warblers prefer riparian habitats dominated by cottonwoods, willows, alders, and other small trees. In the Planning Area, they are found in a variety of desert communities with an overstory, such as microphyll woodlands, mesquite hummocks, desert oases, and riparian woodlands.

Yellow warblers mostly feed on insects and spiders gleaned from the tree and shrub canopy. They also catch insects on the wing and occasionally eat berries.

Yellow warbler is a State Species of Special Concern.

Chuckwalla (*Sauromalus obesus*)

Chuckwallas occur throughout the Mojave and Colorado Deserts in California, Nevada, Utah, Arizona, and Mexico. They are found in appropriate habitat throughout the Planning Area (Map 3-4a Appendix A). Little is known about population size or trends. Primary threats to the species are from overcollecting and destruction of habitat by collectors.

Chuckwallas are large, herbivorous lizards that inhabit rocky outcrops and lava flows. They escape from predators by entering rock crevices and inflating their bodies to wedge themselves firmly into place.

Chuckwallas prefer a variety of annual plants, flowers, and fruits, but commonly climb into shrubs to eat leaves. Feeding is most intense in March and April, but chuckwallas may be active all year in the Planning Area.

Social behavior is complex with large males possessing territories and harems within. Mating occurs from April to June, but reproduction is highly variable based on rainfall and food. They often bask on exposed rocks in the mornings and then forage throughout the day, resting in the shade as required.

The Chuckwalla has no special designations.

Colorado Desert fringe-toed lizard (*Uma notata*)

Colorado Desert fringe-toed lizards are found from northeast San Diego County southward through Imperial County, east to the Colorado River, and south into Baja California. Within the Planning Area they occur only in the extreme south adjacent to the Algodones Dunes (Map 3-4a Appendix A). Little is known about trends in population size or distribution.

Colorado Desert Fringe-toed lizards area medium sized, largely insectivorous lizards restricted to sand dunes with fine sand. They can be difficult to distinguish from other fringe-toed lizards in California. Fringe-toed lizards in general have numerous adaptations for a sand-dwelling lifestyle. The most notable adaptation is the enlarged fringes on the third and fourth toes of the hindfoot that enable them to achieve considerable speeds on the sand surface. Other adaptations for burying under the sand include a countersunk lower jaw, valved nostrils, and a flattened body.

Colorado Desert fringe-toed lizards eat a variety of insects, such as caterpillars, antlion larvae, bugs, grasshoppers, beetles, and ants. They also eat flowers, buds, leaves, and seeds and occasionally other lizards. They probably obtain all their water from their food.

They are active between March and October, with hibernation occurring between November and February. Daily activity patterns are highly temperature dependent. Adults usually mate in May, but will not reproduce if there is little food. Females usually deposit two (ranging from 1-5) eggs per clutch from late May until August. More than one clutch per year may be produced.

Their sandy habitats are fragile and have been heavily impacted by off-road vehicles. Their diving-under-sand escape response makes them particularly vulnerable to injury from off-road vehicles. Potential indirect impacts on habitat are associated with the disruption of ecosystem processes involving sand sources, wind transport, and sand corridors.

Colorado Desert fringe-toed lizard is a State Species of Special Concern.

Mojave fringe-toed lizard (*Uma scoparia*)

Mojave fringe-toed lizards are found only in California and a small area of western Arizona, where they are restricted to dune habitats in the deserts of Los Angeles, Riverside, and San Bernardino Counties in California and La Paz County in Arizona. In the Planning Area they are known from the following areas:

Bristol Dry Lake, Cadiz Dry Lake, Dale Dry Lake, Rice Valley, Pinto Basin, Palen Dry Lake, and Ford Dry Lake (Map 3-4a Appendix A). There is no information on population trends.
They are restricted to areas with fine sand including both large and small dunes, margins of dry lakebeds and washes, and isolated pockets against hillsides.

Mojave fringe-toed lizards are also a medium sized, omnivorous lizards restricted to sand dunes with fine sand. They are distinguishable from all other species of fringe-toed lizards by the presence of crescent-shaped markings on the throat. Adaptations and behaviors for living in sand dunes are similar to those described for the Colorado Desert fringe-toed lizard.

Mojave Fringe-toed lizards are omnivorous, feeding on dried seeds, flowers, grasses, leaves, insects, and scorpions. Food preference shifts seasonally according to availability.

Impacts are similar to those described for the Colorado Desert fringe-toed lizard.

Mojave fringe-toed lizard is a State Species of Special Concern.

Flat-tailed horned lizard (*Phrynosoma mcallii*)

Flat-tailed horned lizards occur throughout the southern portion of the Colorado Desert from the Coachella Valley southward and eastward into Arizona and south into neighboring Sonora. Large portions of the historic range have been lost to inundation of the Salton Sea, urbanization, and agricultural development. Within the Planning Area, suitable habitat occurs only along the southern edge (Map 3-4a Appendix A). The subpopulation that occurs in the Planning Area is not in any of five Management Areas designated as part of an overall strategy to conserve the species. Despite considerable effort over the past 15 years, population sizes and trends are unknown due to difficulties in finding an effective population estimation procedure.

Flat-tailed horned lizards, like other horned lizards, have a flattened body shape with horns along the sides in rows and on the head. They are distinguishable from other horned lizards by a dark stripe down the back. They are extremely cryptic, blending into the soil of whatever color. They generally occur on sandy flats, hills, and badlands usually with creosote bush.

They feed almost exclusively on harvester ants, obtaining water from their prey. They forage actively or wait along ant trails or nest entrances.

Adults hibernate through the winter usually from mid-November to mid-February. Juveniles are active during most of the winter allowing them to continue growing to reproductive maturity. Females lay comparatively (to other horned lizards) small clutches of three to ten eggs in May. In favorable years they may deposit a second clutch in late summer. During the active season, flat-tailed horned lizards spend the night in shallow burrows or on the surface. During the day they may seek shelter in a burrow, under vegetation, or by wiggling below the soil surface.

Flat-tailed horned lizards use cryptic coloration and freezing to avoid danger. Sometimes they quickly bury themselves in loose soil by wiggling in a side-to-side movement.

The flat-tailed horned lizard is a BLM California Sensitive Species and a State Species of Special Concern.

Desert rosy boa (*Lichanura trivirgata*)

Although widely distributed, rosy boas are uncommon throughout their range. Desert rosy boas are found only in southeastern California and southeastern Arizona (Map 3-4e Appendix A). The most significant threats are from overcollection for the pet trade and the destruction of habitat by collectors.
Desert rosy boas are medium sized snakes. They prefer a mixture of brushy cover and rocky soil, such as

is found in desert canyons, washes, and mountains. Although not requiring water, they are often found near oases and permanent or intermittent streams.

The diet of rosy boas consists of small mammals and birds, which are killed by constriction. They forage over a wide area. When threatened, they may roll into a ball and hide their head among the coils.

Rosy boas are live-bearers of 3-12 young that are born in October or November. They are primarily nocturnal, but may be out in the evening or morning in the spring and may appear during the day. Most activity occurs in late spring to early or mid-summer. They hibernate in winter.

Desert rosy boa has no special designation.

Desert tortoise (*Gopherus agassizii*)

Desert tortoises are widely distributed in the desert: from as far north as Olancha south to the Mexican border and from the Colorado River west to near Lancaster. The Desert Tortoise (Mojave Population) Recovery Plan shows two major populations or *recovery units* in the Planning Area. These are the Northern Colorado Desert and Eastern Colorado Desert Recovery Units. The highest densities of tortoises are in Chemehuevi and Ward Valleys, on Chuckwalla Bench, and in JTNP. The USFWS has designated *critical habitat* for the desert tortoise (Map 3-5 Appendix A). Populations have declined precipitously in some parts of the range, such as Chuckwalla Bench. Causes for declines include habitat loss, diseases, excessive predation on young tortoises by ravens, collecting, shooting, highway and vehicle kills, and other factors.

Desert tortoises are found in a variety of habitats including desert scrub, Joshua tree woodland, and alkali desert scrub habitats. In California, the highest density populations occur in the creosotebush scrub habitat. They are most prevalent at elevations of about 1500 to 3000 feet.

Desert tortoises are the largest reptile found in the California desert; adults can grow to over 14 inches in length. When frightened, they withdraw almost completely within their shell, and most exposed surfaces are protected by tough skin or strong well developed scales.

Desert tortoises are herbivores and begin feeding shortly after they emerge from hibernation burrows in the spring. They eat primarily annual forbs, but perennial plants such as cacti and grasses are also important food items. Succulent plants are preferred and are an important source of water. As the season progresses succulent plants become less common, and tortoises begin eating more dried material. Another feeding period typically occurs in the fall after a short summer estivation underground.

Most tortoises do not begin breeding activities until 12-20 years old. Soon after they emerge from hibernation in the spring, male tortoises begin searching for mates, and breeding occurs soon after. Most eggs are laid in the late spring or fall typically at the mouth of a burrow. They hatch in about 90-120 days. Desert tortoises lay from 1 to 3 clutches of eggs per year.

The desert tortoise is a Federal Threatened Species (Mojave Population only) and State-listed Threatened Species.

Couch's spadefoot toad (*Scaphiopus couchi*)

The range of Couch's spadefoot extends from extreme southeastern California eastward through Arizona, New Mexico, Texas, and Oklahoma and southward into Mexico. In California, they occur in the Planning Area from Chemehuevi Wash south to the Ogilby area in Imperial County (Map 3-4a Appendix A).

Couch's spadefoot toads occur in a variety of vegetation types, including desert dry wash woodland, creosote bush scrub, and alkali sink scrub. The soil must be loose enough for the construction of burrows and capable

of sustaining temporary ponds after summer thundershowers.

Couch's spadefoot toads are burrowing amphibians that spends the vast majority of their lives underground. A black, cornified, teardrop-shaped spade found on each hindfoot is used for digging.

Couch's spadefoot toads are present on the surface for less than one month during years when there has been sufficient rainfall to allow for runoff ponds to form. They emerge and congregate at ponds, mate, lay eggs, eat, and perform all life sustaining functions within a brief period. They eat a variety of arthropods, such as termites, beetles, ants, grasshoppers, solpugids, scorpions, and centipedes. They are capable of surviving a year on a single, large meal of termites. Tadpoles are occasionally cannibalistic, but eat mostly invertebrates. If temperatures are right, eggs may hatch in less than a day, and tadpoles may metamorphose in as few as 7 days. Adults and young toads then go underground again for 10-11 months.

The population size is unknown. This species is of concern because 1) it has a small range in California; 2) populations are declining in other states; 3) it has a precarious life history; and 4) the capability of sites to impound runoff is easily destroyed. Road construction has created some pond habitat in Imperial County, but these are often subject to off-highway vehicle driving which can destroy soil impoundment capability. In addition to habitat disturbance, vehicles create noise similar to rainfall, resulting in emergence when conditions are not favorable. Vehicles may also crush vegetative debris which is essential as daytime cover.

The Couch's spadefoot toad is a State Species of Special Concern.

Table N-1. All Alternatives. Acres and percent of total of the range (number of known sites for species indicated) of each special status plants within JTNP, CMAGR, and BLM wilderness.

Special status plant	JTNP	CMAGR	BLM Wilderness
Angel trumpet			868 (41)
Harwood's rattleweed			3,096 (43)
Borrego milkvetch			
Coachella Valley milkvetch	1 site (33)		
Red grama			14,542 (91)
Fairyduster		60,383 (13)	77,342 (16)
Saguaro			8 sites (80)
Crucifixion thorn	491 (<1)	494 (<1)	27,740 (15)
Los Animas colubrina	65,301 (17)	26,527 (7)	127,135 (34)
Spiny abrojo		164,746 (25)	50,811 (7)
Wiggins'croton			
Winged cryptantha			
California ditaxis	78,608 (34)		52,428 (22)
Glandular ditaxis			944 (16)
Howe's hedgehog cactus			169 (37)
Foxtail cactus	489,172 (12)		1,392,949 (33)
Crown-of-thorns		90,263 (94)	1,536 (2)
Spearleaf	1,825 (1)	35,801 (24)	43,254 (29)
Robison's monardella			4,427 (93)
Munz' cholla		286,274 (86)	2,847 (1)
Wiggins' cholla			
Giant Spanish-needle			
White-margined beardtongue			
Sand food			
Arizona pholistoma			65,818 (69)
Lobed ground-cherry	4,785 (7)		13,722 (21)
Desert unicorn plant	3,222 (<1)	197,357 (7)	840,431 (31)
Orocopia sage		32,470 (29)	53,186 (47)
Coues' cassia		49 (<1)	61,143 (64)
Mesquite nest straw			
Jackass clover			39 (<1)
Mecca-aster			19,489 (78)

Table N-2. No Action Alternative. Acres and percent of total of the range (number of known sites for species indicated) of each special status plant within each BLM Multiple-Use Class: Controlled (C), Limited (L), Moderate (M), and Intensive (I), and Unclassified lands.

Special status plant	MUC C	MUC L	MUC M	MUC I	Unclassified
Angel trumpet			869 (41)		396 (19)
Harwood's rattleweed	30 (<1)	1748 (24)	293 (4)		2,000 (28)
Borrego milkvetch		1 Site (25)	3 Sites 75)		
Coachella Valley milkvetch		2 Sites (66)			
Red grama	1,472 (9)				
Fairyduster	628 (1)	157,600 (33)	173,578 (37)	41 (<1)	
Saguaro	8 sites (80)	1 site (10)	1 site (10)		
Criucifixion thorn	1,705 (1)	103,331 (57)	46,769 (26)		
Los Animas colubrina	68,104 (17)	122,039 (32)	16,037 (4)	19,401 (5)	
Spiny abrojo	637 (<1)	279,124 (41)	177,304 (26)		
Wiggins'croton			3,932 (95)	192 (5)	
Winged cryptantha			1 site (100)		
California ditaxis	80,343 (35)	29,040 (13)	72,889 (31)	843 (<1)	
Glandular ditaxis		3,501 (58)	2,000 (33)		
Howe's hedgehog cactus			293 (63)		
Foxtail cactus	505,775 (12)	1,023,507 (25)	1,150,257 (27)	83,321 (2)	51,257 (1)
Crown-of-thorns		1,147 (1)	2,535 (3)		
Spearleaf	2,966 (2)	64,239 (43)	2,909 (2)		
Robison's monardella		310 (7)			
Munz' cholla		37,339 (11)	5,001 (2)		8 (<1)
Wiggins' cholla					2 sites (100)
Giant Spanish-needle			3,932 (95)	192 (5)	
White-margined beardtongue		2 sites (100)			
Sand food			3,932 (95)	192 (5)	
Arizona pholistoma	3,305 (4)	25,351 (27)	1,872 (2)		
Lobed ground-cherry	5,048 (7)	5,784 (9)	41,409 (63)		
Desert unicorn plant	18,982 (1)	841,611 (31)	695,499 (26)		96,217 (4)
Orocopia sage	1,379 (1)	16,457 (15)	7,751 (7)		49 (<1)
Coues' cassia	1,902 (2)	23,698 (25)	8,124 (8)		
Mesquite nest straw			3,670 (100)		
Jackass clover	216 (1)	8,131 (27)	21,524 (72)		
Mecca-aster	250 (1)	606 (2)	5,174 (21)		240 (1)

Table N-3. No Action Alternative. Acres and percent of total of the range (number of known sites for species indicated) of each special status plant within four BLM grazing allotments: Lazy Daisy Cattle, Chemehuevi Cattle, Rice Valley Sheep, and Ford Dry Lake Sheep.

Special status plant	Lazy Daisy Cattle	Chemehuevi Cattle	Rice Valley Sheep	Ford Dry Lake Sheep
Angel trumpet				
Harwood's rattleweed				
Borrego milkvetch				
Coachella Valley milkvetch				
Red grama				
Fairyduster				
Saguaro				
Crucifixion thorn	28,138 (15)	85,370 (46)		
Los Animas colubrina				12 (<1)
Spiny abrojo				
Wiggins' croton				
Winged cryptantha				
California ditaxis				
Glandular ditaxis		1,661 (21)		
Howe's hedgehog cactus				
Foxtail cactus	332,886 (8)	135,595 (3)	85,55 (2)	49,681 (1)
Crown-of-thorns				
Spearleaf				
Robison's monardella				
Munz' cholla				
Wiggins' cholla				
Giant Spanish-needle				
White-margined beardtongue				
Sand food				
Arizona pholistoma		1,799 (2)		
Lobed ground-cherry	28,947 (41)			
Desert unicorn plant	5 (<1)	135,595 (5)	85,565 (3)	49,681 (2)
Orocopia sage				
Coues' cassia				
Mesquite nest straw				
Jackass clover				270 (1)
Mecca-aster				

Table N-4. All Alternative. Acres and percent of range of each special status animal within JTNP, CMAGR, and BLM wilderness areas.

Special Status Animal	JTNP	CMAGR	BLM Wilderness
Burro deer	40,113 (6)	131,824 (21)	68,551 (11)
California leaf-nosed bat	367,951 (9)	413,629 (10)	1,219,238 (29)
Occult little brown bat			347,313 (28)
Cave myotis			347,313 (28)
Fringed myotis	50,023 (2)		920,797 (43)
Pallid bat	489,253 (9)	453,750 (9)	1,553,070 (30)
Townsend's big-eared bat	474,842 (9)	399,600 (8)	1,531,435 (30)
Pocketed free-tailed bat	293,390 (15)	205,955 (11)	894,231 (46)
Western mastiff bat	293,390 (15)	205,955 (11)	894,231 (46)
Mountain lion	192,480 (6)	459,558 (15)	701,904 (23)
Colorado Valley woodrat	4,733 (<1)	459,581 (19)	560,128 (23)
Mountain plover			
Ferruginous hawk	489,253 (9)	459,581 (8)	1,586,393 (29)
Golden eagle	489,253 (9)	459,581 (8)	1,586,393 (29)
Prairie falcon	488,788 (9)	459,529 (9)	1,424,436 (28)
Elf owl	540 (<1)		71,904 (66)
Burrowing owl	489,253 (9)	459,581 (8)	1,586,393 (29)
Gila woodpecker			3,479 (4)
Vermilion flycatcher			48,317 (19)
Bendire's thrasher	219,074 (34)		139,390 (21)
Crissal thrasher	82 (<1)		199,304 (41)
LeConte's thrasher	244,555 (7)	297,969 (8)	834,714 (22
Yellow warbler			1,216 (3)
Chuckwalla	289,351 (10)	284,288 (10)	1,061,403 (38)
Colorado Desert fringe-toed lizard			
Mojave fringe-toed lizard	246,875 (9)		836,167 (29)
Flat-tailed horned lizard			
Desert rosy boa	485,698 (9)	459,579 (9)	1,570,953 (29)
Couch's spadefoot toad		351,516 (16)	428,837 (20)

Table N-5. All Alternatives. Acres and percent of range of each special status animal within BLM utility corridors.

Special Status Animal	Utility Corridor
Burro deer	92,683 (15)
California leaf-nosed bat	571,980 (14)
Occult little brown bat	267,324 (21)
Cave myotis	267,324 (21)
Fringed myotis	276,781 (13)
Pallid bat	664,443 (13)
Townsend's big-eared bat	669,134 (13)
Pocketed free-tailed bat	86,145 (4)
Western mastiff bat	86,415 (4)
Mountain lion	391,710 (13)
Colorado Valley woodrat	345,565 (14)
Mountain plover	20,249 (12)
Ferruginous hawk	730,817 (13)
Golden eagle	730,817 (13)
Prairie falcon	660, 950 (13)
Elf owl	3,873 (4)
Burrowing owl	730,817 (13)
Gila Woodpecker	61,390 (25)
Vermilion flycatcher	83,382 (13)
Bendire's thrasher	83,382 (13)
Crissal thrasher	97,095 (20)
LeConte's thrasher	597,094 (16)
Yellow warbler	16,936 (38)
Chuckwalla	229,796 (8)
Colorado Desert fringe-toed lizard	2,045 (52)
Mojave fringe-toed lizard	410,333 (14)
Flat-tailed horned lizard	15,647 (73)
Desert rosy boa	705,155 (13)
Couch's spadefoot toad	292,486 (14)

Table N-6. No Action Alternative. Acres and percent of range of each special status animal within four livestock BLM livestock grazing allotments.

Special Status Animal	Lazy Daisy Cattle	Chemehuevi Cattle	Rice Valley Sheep	Ford Dry Lake Sheep
Burro deer	5,462 (1)	6,317 (1)	8,110 (1)	5,355 (1)
California leaf-nosed bat	188,558 (5)	128,005 (3)	73,553 (2)	35,014 (1)
Occult little brown bat		110,571 (9)		
Cave myotis		110,571 (9)		
Fringed myotis	332,886 (16)	135,595 (6)		
Pallid bat	331,238 (6)	110,018 (2)	58,021 (1)	37,657 (1)
Townsend's big-eared bat	320,947 (6)	130,908 (3)	76,352 (2)	33,700 (1)
Pocketed free-tailed bat	125,644 (6)	2,643 (<1)	195 (<1)	13 (<1)
Western mastiff bat	125,644 (6)	2,643 (<1)	195 (<1)	13 (<1)
Mountain lion		18,597 (1)	30,570 (1)	44,196 (2)
Colorado Valley woodrat		50 (<1)	19,875 (1)	49,681 (2)
Mountain plover				5,269 (3)
Ferruginous hawk	332,886 (6)	135,595 (2)	85,565 (2)	49,681 (1)
Golden eagle	332,886 (6)	135,595 (2)	85,565 (2)	49,681 (1)
Prairie falcon	332,886 (6)	132,270 (3)	85,565 (2)	49,681 (1)
Elf owl		2,076 (2)		
Burrowing owl	332,886 (6)	135,595 (2)	85,565 (2)	49,681 (1)
Gila woodpecker		2,495 (3)		
Vermilion flycatcher				
Bendire's thrasher	120,733 (19)	84,454 (13)		
Crissal thrasher		12,159 (3)		
LeConte's thrasher	243,170 (7)	113,218 (3)	85,014 (2)	49,669 (1)
Yellow warbler		345 (1)		
Chuckwalla	127,107 (5)	75,227 (3)	8,719 (<1)	5,021 (<1)
Colorado Desert fringe-				
Mojave fringe-toed lizard	166,577 (6)	100,421 (4)	85,515 (3)	49,669 (2)
Flat-tailed horned lizard				
Desert rosy boa	329,019 (6)	135,595 (3)	74,595 (1)	39,201 (1)
Couch's spadefoot toad		120,735 (6)	47,532 (2)	31,150 (1)

Table N-7. Acreage and the percent of range of each special status animal within the burro herd management areas.

Special Status Animal	Preferred/Large DWMA Alternative Chemhuevi HMA	Preferred/Large DWMA Alternative Chocolate-Mule Mountain HA/HMA
Burro deer	1,140 (<1)	13,902 (2)
California leaf-nosed bat	105,282 (2)	151,079 (4)
Occult little brown bat	111,652 (9)	202,492 (16)
Cave myotis	111,652 (9)	202,492 (16)
Fringed myotis	90,308 (4)	0
Pallid bat	110,819 (2)	202,492 (4)
Townsend's big-eared bat	111,652 (2)	202,492 (4)
Pocketed free-tailed bat	68,462 (4)	129,793 (7)
Western mastiff bat	68,462 (4)	129,793 (7)
Mountain lion	101,412 (3)	202,492 (7)
Colorado Valley woodrat	89,818 (4)	202,492 (8)
Mountain plover	0	0
Ferruginous hawk	111,652 (2)	202,492 (4)
Golden eagle	111,652 (2)	202,492 (4)
Prairie falcon	67,148 (1)	116,436 (2)
Elf owl	68,462 (63)	5,241 (5)
Burrowing owl	111,652 (2)	202,492 (4)
Gila woodpecker	1,143 (1)	12,432 (13)
Vermilion flycatcher	0	0
Bendire's thrasher	908 (<1)	0
Crissal thrasher	55,127 (11)	119,597 (24)
LeConte's thrasher	22,386 (1)	70,868 (2)
Yellow warbler	781 (2)	5,928 (13)
Chuckwalla	101,696 (4)	188,658 (7)
Colorado Desert fringe-toed lizard	0	0
Mojave fringe-toed lizard	78,429 (3)	0
Flat-tailed horned lizard	0	0
Desert rosy boa	111,652 (2)	202,492 (4)
Couch's spadefoot toad	106,942 (5)	202,531 (9)

Table N-8. Preferred/Large DWMA Alternative. Acres and percent of range of each special status animals within the large DWMAs, Multi-species WHMA, and conservation zone.

Special Status Animal	DWMAs	Multi-species WHMA	Conservation zone
Burro deer	303,642 (48)	73,352 (12)	513,297 (81)
California leaf-nosed bat	1,291,171 (31)	402,080 (10)	3,224,558 (77)
Occult little brown bat	214,315 (17)	184,859 (15)	728,582 (58)
Cave myotis	214,315 (17)	184,859 (15)	728,582 (58)
Fringed myotis	831,112 (39)	154,368 (7)	1,649,352, (77)
Pallid bat	1,606,983 (31)	486,187 (9)	3,944,952 (76)
Townsend's big-eared bat	1,540,602 (30)	497,905 (10)	3,863,242 (75)
Pocketed free-tailed bat	457,567 (23)	102,432 (5)	1,660,526 (85)
Western mastiff bat	457,567 (23)	102,432 (5)	1,660,526 (85)
Mountain lion	838,096 (28)	324,075 (11)	2,164,855 (72)
Colorado Valley woodrat	789,319 (32)	260,981 (11)	1,727,468 (71)
Mountain plover	1,276 (1)	86,586 (53)	87,862 (54)
Ferruginous hawk	1,684,893 (30)	537,474 (10)	4,101,826 (74)
Golden eagle	1,684,893 (30)	537,474 (10)	4,101,826 (74)
Prairie falcon	1,675,471 (32)	513,747 (10)	3,908,004 (75)
Elf owl	30,270 (28)	5,133 (5)	97,903 (89)
Burrowing owl	1,684,893 (30)	537,474 (10)	4,101,826 (74)
Gila woodpecker	30,151 (32)	37,863 (41)	71,156 (77)
Vermilion flycatcher		50,278 (20)	98,577 (40)
Bendire's thrasher	272,200 (42)		590,609 (90)
Crissal thrasher	15,937 (3)	70,025 (14)	283,274 (58)
LeConte's thrasher	1,294,512 (35)	458,359 (12)	2,710,761 (73)
Yellow warbler	7,141 (16)	21,837 (49)	30,193 (68)
Chuckwalla	870,417 (31)	175,100 (6)	2,240,497 (80)
Colorado Desert fringe-toed lizard		3,905 (98)	3,905 (98)
Mojave fringe-toed lizard	765,204 (26)	376,885 (13)	1,989,552 (69)
Flat-tailed horned lizard		4,127 (19)	4,127 (19)
Desert rosy boa	1,676,985 (31)	422,418 (8)	3,960,332 (74)
Couch's spadefoot toad	680,859 (32)	242,663 (11)	1,492,695 (69)

Table N-9. No Action and Preferred/Large DWMA Alternatives. Average number of miles of road (not including navigable washes) per square mile in the range of each special status animal.

Special Status Animal	Mi. of road/mi.^{2}
Burro deer	.947
California leaf-nosed bat	.624
Occult little brown bat	.813
Cave myotis	.813
Fringed myotis	.519
Pallid bat	.601
Townsend's big-eared bat	.616
Pocketed free-tailed bat	.251
Western mastiff bat	.251
Mountain lion	.642
Colorado Valley woodrat	.725
Mountain plover	.433
Ferruginous hawk	.609
Golden eagle	.609
Prairie falcon	.600
Elf owl	.463
Burrowing owl	.609
Gila woodpecker	1.381
Vermilion flycatcher	.794
Bendire's thrasher	.486
Crissal thrasher	.764
LeConte's thrasher	.768
Yellow warbler	1.469
Chuckwalla	.404
Colorado Desert fringe-toed lizard	.269
Mojave fringe-toed lizard	.661
Flat-tailed horned lizard	.588
Desert rosy boa	.613
Couch's spadefoot toad	.689

Table N-10. Preferred/Large DWMA Alternative. Acres and percent of range of each special status animal in the areas where all navigable washes are open to vehicles.

Special Status Animal	Open washes
Burro deer	163,372 (26)
California leaf-nosed bat	464,406 (11)
Occult little brown bat	100,064 (8)
Cave myotis	100,064 (8)
Fringed myotis	192,522 (9)
Pallid bat	546,292 (11)
Townsend's big-eared bat	541,776 (11)
Pocketed free-tailed bat	123,981 (6)
Western mastiff bat	123,981 (6)
Mountain lion	381,856 (13)
Colorado Valley woodrat	359,830 (15)
Mountain plover	133 (< 1)
Ferruginous hawk	574,898 (10)
Golden eagle	574,898 (10)
Prairie falcon	574,898 (10)
Elf owl	15,120 (14)
Burrowing owl	574,898 (10)
Gila woodpecker	27,733 (30)
Vermilion flycatcher	0
Bendire's thrasher	93,193 (14)
Crissal thrasher	5,209 (1)
LeConte's thrasher	458,526 (12)
Yellow warbler	7,136 (16)
Chuckwalla	271,173 (10)
Colorado Desert fringe-toed lizard	
Mojave fringe-toed lizard	237,261 (8)
Flat-tailed horned lizard	
Desert rosy boa	568,887 (11)
Couch's spadefoot toad	337,776 (16)

Table N-11. Small DWMA A Alternative. Acres and percent of range of each special status animal within the small DWMAs, Multi-species WHMA, and conservation zone.

Special Status Animal	small DWMAs	Multi-species WHMA	Conservation zone
Burro deer	183,438 (29)	194,278 (31)	516,716 (81)
California leaf-nosed bat	1,056,014 (25)	624,995 (15)	3,252,178 (77)
Occult little brown bat	183,552 (15)	209,620 (17)	728,510 (58)
Cave myotis	183,552 (15)	209,620 (17)	728,510 (58)
Fringed myotis	696,600 (33)	242,675 (11)	1,649,887 (77)
Pallid bat	1,318,663 (25)	740,491 (14)	3,972,852 (77)
Townsend's big-eared bat	1,254,336 (24)	752,499 (15)	3,891,307 (76)
Pocketed free-tailed bat	397,450 (20)	148,283 (8)	1,665,395 (86)
Western mastiff bat	397,450 (20)	148,283 (8)	1,665,395 (86)
Mountain lion	652,160 (22)	502,430 (17)	2,171,462 (72)
Colorado Valley woodrat	622,166 (26)	439,743 (18)	1,753,846 (72)
Mountain plover	1,276 (1)	86,586 (53)	87,862 (54)
Ferruginous hawk	1,384,216 (25)	803,976 (15)	4,129,727 (74)
Golden eagle	1,384,216 (25)	803,976 (15)	4,129,727 (74)
Prairie falcon	1,374,793 (27)	780,402 (15)	3,935,903 (76)
Elf owl	30,264 (28)	5,157 (5)	97,920 (89)
Burrowing owl	1,384,216 (25)	803,976 (15)	4,129,727 (74)
Gila woodpecker	2,608 (3)	65,358 (70)	71,175 (77)
Vermilion flycatcher	76 (<1)	50,186 (20)	98,577 (40)
Bendire's thrasher	210,305 (32)	32,274 (5)	590,970 (90)
Crissal thrasher	10,414 (2)	74,609 (15)	283,215 (58)
LeConte's thrasher	1,042,711 (28)	685,335 (18)	2,735,798 (74)
Yellow warbler		28,995 (66)	30,211 (68)
Chuckwalla	728,996 (26)	292,296 (10)	2,245,281 (80)
Colorado Desert fringe-toed lizard		3,906 (98)	3,906 (98)
Mojave fringe-toed lizard	666,738 (23)	449,005 (16)	1,992,348 (69)
Flat-tailed horned lizard		4,128 (19)	4,128 (19)
Desert rosy boa	1,379,546 (26)	685,795 (13)	3,988,232 (74)
Couch's spadefoot toad	489,832 (23)	421,508 (20)	1,491,024 (69)

Table N-12. Acres and percent of range of special status species plants within large DWMAs, Multi-species WHMAs, and the total of Conservation Zone (sightings points used in absence of predicted range)

Special status plant	DWMAs	Multi-Species WHMA	Conservation Zone
Angel trumpet	0	587 (28)	1,824 (87)
Harwood's rattleweed	3,999 (56)	234 (3)	4,233 (59)
Borrego milkvetch	0	1 points (25)	3 points (75)
Coachella Valley milkvetch	0	3 points (50)	4 points (67)
Red grama	1,984 (12)	0	15,997 (100)
Fairyduster	68,136 (14)	90,528 (19)	352,009 (74)
Saguaro	1 point (8)	1 point (8)	10 points (83)
Crucifixion thorn	176,004 (98)	935 (1)	179,536 (100)
Los Animas colubrina	232,888 (61)	0	377,209 (99)
Spiny abrojo	391,063 (58)	84,058 (12)	577,275 (70)
Wiggins'croton	0	4,059 (99)	4,059 (99)
Winged cryptantha	0	0	1 point (50)
California ditaxis	137,792 (59)	0	221,641 (95)
Glandular ditaxis	3,956 (66)	0	3,956 (66)
Howe's hedgehog cactus	0	0	165 (36)
Foxtail cactus	1,213,808 (29)	412,767 (10)	3,423,587 (82)
Crown-of-thorns	69,081 (71)	0	96,979 (100)
Spearleaf	140,947 (94)	0	148,494 (99)
Robison's monardella	0	0	4,722 (98)
Munz' cholla	175,312 (52)	0	333,207 (99)
Wiggins' cholla	0	0	0
Giant Spanish-needle	0	4,059 (99)	4,059 (99)
White-margined beardtongue	0	0	0
Sand food	0	4,059 (99)	4,059 (99)
Arizona pholistoma	23,296 (25)	0	94,722 (100)
Lobed ground-cherry	51,624 (78)	0	65,902 (100)
Desert unicorn plant	1,025,543 (38)	338,776 (13)	2,147,928 (80)
Orocopia sage	48,050 (43)	0	110,860 (99)
Coves' cassia	71,751 (75)	0	94,664 (99)
Mesquite nest straw	3,421 (93)	0	3,421 (93)
Jackass clover	0	29,573 (99)	29,573 (99)
Mecca-aster	784 (3)	0	23,534 (97)

Appendix O
Perspectives on Proposals for and Changes to Management Areas

The amount of land involved in plan proposals and changes to current management is indicated in various places in the chapters. However, the following statistical information is not and may be useful in discussing and analyzing the plan proposals and impacts.

The following are common to the tables

1. NA = No Action Alternative
2. P = Preferred/Large DWMA Alternative
3. A = Small DWMA A Alternative
4. B = Small DWMA B Alternative

Agency acronyms are used.

Table O-1 Percent and acres of total planning area expressed in general land uses for BLM, JTNP and CMAGR - by alternative

Agency Management Areas	Alternative			
	No Action	Preferred	Small DWMA A	Small DWMA B
BLM - MUCs				
C (Wilderness)	29/1,601,740**	29/1,584,545	29/1,584,545	29/1,584,545
L*	25/1,386,395	32/1,797,339	31/1,712,275	31/1,712,275
M*	25/1,398,912	19/1,022,980	20/1,108,043	20/1,108,043
I	2/83,466	1/62,909	1/62,909	1/62,909
Unclassified	2/126,374	2/130,349	2/130,349	2/130,349
JTNP	9/489,253	9/489,253	9/489,253	9/489,253
CMAGR				
Target areas	<1/2,813	<1/2,813	<1/2,813	<1/2,813
Non-target area	8/456,766	8/456,766	8/456,766	8/456,766

* MUC M is changed to MUC L in DWMAs

Table O-2 Percent and acres of total planning area expressed in general conservation zones - by alternative

Conservation Zones	Alternative			
	No Action**	Preferred	Small DWMA A	Small DWMA B
Restricted Areas*	46/2,535,005	46/2,535,005	46/2,535,005	46/2,535,005
DWMAs (outside above)	21/1,180,991	19/1,054,227	14/785,234	14/785,234
WHMAs (outside above)	2/110,362	17/972,359	22/1,240,530	19/1,061,251
Remaining areas from all above to equal 100%	31/1,721,308	18/986,074	18/986,896	21/1,166,175

* Restricted Areas = JTNP, CMAGR, BLM wilderness

** In the No Action Alternative, Critical Habitat and existing HMP areas are used in place of DWMAs and WHMAs, respectively.

Table O-3 Percent and acres of distribution of BLM MUCs in WHMAs (BLM land only) and Remaining Areas (from Table _2). Each group = 100%.

Conservation Zones	Alternative		
	Preferred	Small DWMA A	Small DWMA B
WHMAs - Multi-Species & Bighorn Sheep			
MUC C (incl Bighorn Sheep, only)	37/1,107,331	36/1,107,762	38/1,107,657
MUC L	26/772,527	28/862,723	28/811,920
MUC M	15/442,085	17/528,889	15/427,866
MUC I	2/61,996	2/61,996	1/41,250
Remaining Areas			
MUC L	29/287,257	29/289,767	29/340,540
MUC M	59/579,940	59/578,168	58/679,190
MUC I	<1/913	<1/913	2/21,659

Table O-4 Acres of State Lands Commission to be acquired.

Zone	Alternative		
	Preferred	Small DWMA A	Small DWMA B
DWMAs	39,299	29,053	29,053
Wilderness Outside of DWMAs	26,674	27,937	27,937
Total	65,973	56,990	56,990

Table O-5 Percent of Bighorn Sheep metapopulations by Federal land management agency (including corridors).

Metapopulation	Alternatives: Preferred/Large DWMA, Small DWMA A & B.		
	BLM	JTNP	CMAGR
Sonoran	73	0	27
Southern Mojave	82	18	0

Table O-6 Percent of Bighorn Sheep metapopulations on BLM lands by MUC.

MUC	Sonoran Metapopulation		Southern Mojave Metapopulation	
	Preferred	Small A & B	Preferred	Small A & B
C	45	45	58	58
L	44	42	29	28
M	11	13	12	13
I	0	0	<1	<1
Unclassified	<1	,1	<1	<1

Table O-7 Percent of Special Management Areas designated in CDCA Plan (shown on CDCA Plan Map No. 3) included in Conservation Zone - Preferred Alternative.

Special Management Areas (Y/N - was a management plan developed)	Target Species or Habitat	% in Conservation Zone
ACECs		
56 - Corn Spring (Y)	Habitat (oasis)	100
57 - Chuckwalla Valley Dunes Thicket (Y)	Habitat	100
59 - Chuckwalla Bench (Y)	Desert Tortoise/Habitat	100
Desert Lily Preserve (Y)	Desert Lily	100
Habitat Management Plans (HMPs)		
Bigelow Cholla (N)	Bigelow Cholla	100
Special Management Areas (Y/N - was a management plan developed?)	**Target Species or Habitat**	**% in Conservation Zone**
W35 - Fenner/Chemehuevi Valleys (N) W37 - Chemehuevi Wash (N) W38 - Whipple Mountain (Y) W39 - Vidal Wash (N)	Desert Tortoise, other Habitat	85
No # - Marble Mountain (N)	Bighorn Sheep	45
No # - Sheep Hole Mountains (Y)	Bighorn Sheep	93
W45 - Orocopia Mountains	Bighorn Sheep	85
W46 - Eagle Mountains (N)	Bighorn Sheep	100
W47 - Coxcomb Mountains (N)	Bighorn Sheep	92
W48 - Granite-Palen Mountains (N)	Bighorn Sheep	89
W50 - Rice Valley Dunes (N)	Habitat	99
W51 - McCoy Wash (N)	Habitat	14
W52 - Chuckwalla Bench (N)	Desert Tortoise	100
W53 - Chuckwalla Mtns (Y)	Bighorn Sheep	98
W54 - Ford Dry Lake (N)	Habitat	82
W55 - Milpitas Wash (Y)	Habitat	99
W56 - Palo Verde Mtns (N)	Saguaro Habitat	100
W58 - Indian Wash (N)	Habitat	34
W59 - Algodones Dunes	Habitat	28

Special Attention Areas		
W41 - Cadiz Sand Dunes	Habitat	85
W57 - Picacho Land and Wildlife Management Area	Habitat	90
Special Management Areas (Y/N - was a management plan developed?)	**Target Species or Habitat**	**% in Conservation Zone**
Road Designation Restrictions		
W36 - Stepladder Mtns	Teddy Bear Cholla Thicket	100
W49 - Midland	Ironwood Thicket	80

Appendix P
Boundaries of DWMAs and WHMAs and boundaries of washes are designated as open routes

General

With the sensitive nature and management emphasis placed on Desert Wildlife Management Areas (DWMAs), also designated as ACECs, it is imperative that the public always know where they are and comply with management requirements of these areas. Therefore, boundaries must be well defined - both narratively, on maps, and on the ground. The same need applies to the designation of navigable washes as open on an area basis. Selected boundaries are set to roads or existing restricted areas as much as possible to increase manageability and clarity for the public and are described below. As much information (e.g., road names, mileages, etc) as needed is provide for clarity. Where the boundary is one of the following features, the DWMA boundary is specified as indicated:

- Roads with rights-of-way...the DWMA boundary is the right-of-way boundary that is on the DWMA side of the right-of-way
- Road not contained in a right-of-way...the DWMA boundary is 100 feet from road centerline to the DWMA side of the road
- Park or BLM wilderness boundary (without associated road or other identifiable feature)...the DWMA boundary is the park or wilderness boundary
- Land ownership...the DWMA boundary is a described section/township line
- Current desert tortoise critical habitat...the DWMA boundary is that line (in this case usually inside wilderness or other currently restricted areas where the boundaries for those restricted areas are the more meaningful)
- Roads with six digit numbers (e.g., 690119) are the numbered routes on BLM's routes inventory

Wildlife Habitat Management Areas (WHMAs) boundaries are as delineated on maps and in GIS. See Appendix H for details beyond what follows. In some places it is not possible to identify the boundary to a particular ground or demographic feature and no other discussion is provided below beyond the follow general nature that applies to most of the boundary segments, which are:

- Wilderness and other agency boundaries
- Plant communities and species range limits
- Roads with rights-of-way...WHMA boundary is the right-of-way limit on the WHMA side of the right-of-way
- Roads without rights-of-way...WHMA boundary is 100 feet from the centerline of the road
- Land ownership...WHMA boundary is section line(s)

Large DWMA Boundaries

A. **Joshua Tree National Park DWMA**. DWMA boundary is the park boundary.

B. **Chemehuevi DWMA**. In the northwest part of the DWMA, beginning at the west intersection of Clipper Mountains Wilderness Area and Freeway I-40, DWMA boundary runs as follows:

- south on west wilderness boundary to road 690119 (also a pipeline)
- west about 1.5 miles on inventoried road (690119) to its intersection with non-route 690126 (also a pipeline)
- east on non-route 690126 (also a pipeline), to its intersection with old Route 66
- northeast on old Route 66 to its intersection with road 690119 (also a pipeline)
- about 1.6 miles east on road 690119 (also a pipeline) to its intersection with a section line running between Sections 21-22, 27-28, and 33-34 of T7NR16E; and Sections 3-4 and 9-10 of T6NR16E

- south about 4 miles on above section line to its intersection with road 690200
- southeast on road 690200 to Old Woman Mountains Wilderness Area boundary, crossing the boundary on the same road trace to its intersection with the boundary of current tortoise critical habitat south through wilderness on the boundary of currently designated tortoise critical habitat to its intersection with a railroad (also wilderness boundary)
- south on railroad to its intersection with road 690228
- about 1 mile north on road 690228 to its intersection with road 690608
- northeast on road 690608 to its intersection with road 690609
- southeast on road 690609 to its intersection with road 690616
- northeast on road 690616 to its intersection with road 690622
- northeast, then southeast on road 69022 to Turtle Mountains Wilderness Area boundary
- north and west on wilderness boundary to its intersection with the boundary of currently designated tortoise critical habitat
- north, east, then south through wilderness on the critical habitat boundary to the intersection of wilderness boundary
- south on wilderness boundary to the southern-most intersection of wilderness boundary and road 690734
- south on road 690734 to its intersection with road 690609
- northeast on road 690609 to its intersection with U.S. Highway 95
- as road 690609 crosses (to east of) U.S. Highway 95, it changes to road 690742
- east on road 690742 to its intersection with road 690682
- north on road 690682 to its intersection with Whipple Mountains Wilderness Area boundary
- north on wilderness boundary to the intersection of two roads: 690519 and 690634
- north on road 690519 and wilderness boundary to its intersection with road 690510
- 1/10 mile northeast on 690510 to its intersection with road 690056 (also a power line)
- northwest on road 690056 to its intersection with Lake Havasu Road (a paved highway)
- east on Lake Havasu Road to its intersection with Chemehuevi Mountains Wilderness Area boundary
- north on wilderness boundary to its intersection with U.S. Highway 95
- north on wilderness boundary joint with U.S. Highway 95 to its intersection with road 690203 (also a pipeline)
- west on road 690203 to its intersection with road 690261
- 2/10 mile north on 690261 to its intersection with road 690119 (also a pipeline)
- west on road 690119 to its intersection with road 690257
- north on road 690257 to its intersection with road 690102
- north on road 690102 to its intersection with road 690246
- west on road 690246 to its intersection with road 690243
- west on road 690243 to its intersection with road 690056 (also a power line)
- northwest on road 690056 to its intersection with road 690085
- east on road 690085 to its intersection with road 690073
- west then north on road 690073 to its intersection with road 690064
- west on road 690064 to its intersection with Bigelow Cholla Garden Wilderness Area boundary
- north 1/10 mile on wilderness boundary to its intersection with current boundary tortoise critical habitat
- northwest on critical habitat boundary to its intersection with Freeway I-40
- west on I-40 to its intersection with Clipper Mountains Wilderness Area boundary, thence to the beginning of DWMA as described above but circumventing some lands around freeway exits along I-40 as follows (to the south side, only):
  a. at Water Road the NW1/4 of Section 26 and the NE 1/4 of Section 27 of T9N, R19E
  b. at Mountain Springs Pass the NE1/4 of Section 35 and NW1/4 of Section 36 of T9N, R18E
  c. at Fenner the W½ of Section 3 and the E½ of Section 4 of T8N, R17E

d. at Essex Road the NE1/4 of Section 8 and the NW1/4 of Section 9 of T8N, R16E
e. an additional "cutout" exclusion in the DWMA has been provided for the town of Essex. The excluded area is W½, NE 1/4, and the NW 1/4 of the SE 1//4 of Section 31 of T8N, R17E

C. **Chuckwalla DWMA** In the northwest part of the DWMA, beginning at the intersection of the Joshua Tree National Park boundary and the section line between Sections 22 and 23 in T5S, R9E, DWMA boundary runs as follows:

- east and north on the JTNP boundary to its intersection with road 660327
- east on road 660327 to its intersection with road 660326
- north on road 660326 to its intersection with road 660329
- north on road 660329 to its intersection with road 660334
- northeast on road 660334 to its intersection with road 660332
- south on road 660332 to its intersection with road 660333 (aka Kaiser Road)
- south on road 660333 to its intersection with Highway 177, south on Highway 177 to its intersection with I-10, excluding the following: S½ Section 22, W½ Section 26, and all of Section 27 of T5S, R15E.
- before continuing east on I-10 from its intersection with Highway 177, there are five "cutout" exclusions for freeway exits west of this point (from east to west):
  a. at Eagle Mountain, W½ of Section 29, Section 30, N½ Section 31, NW 1/4 Section 32 of T5S, R15E
  b. at Red Cloud, W½ of Section 6 and the NW1/4 of Section 7 of T6S, R14E and E½ Section 1 and NE1/4 of Section 12 of T6S, R13E
  c. at Hayfield, S½ Section 5 and the N½ Section 8 of T6N, R13E
  d. at Chiriaco Summit, all of Sections 9, 10, and 16
  e. at Box Canyon Highway, all of sections 11, 12, 13, and 14
- (continuing east from item 7, above) east along I-10 to Corn Springs Exist
- east and south of I-10 along the old highway alignment, now named Chuckwalla Road, to its intersection with I-10 at Ford Dry Lake Exit, excluding the SE1/4 of Section 33 and S½ of Section 34 of T6S, R19E
- east along I-10 to its intersection with Wiley Road, excluding the E½ of Section 32 and the W½ of Section 33 of T6S, R20E
- south on Wiley Well Road to its intersection with the Palo Verde Mountains Wilderness Area, excluding (west of Wiley Well Road) the private land of the Chuckwalla Prison area as follows: Section 16, Section 17, the E½ of Section 18, the NE 1/4 of the NW 1/4 of Section 18, and the W½ of NE 1/4 of Section 20
- east along wilderness boundary to its intersection with currently designated tortoise critical habitat
- south on critical habitat boundary (through wilderness) to its intersection with wilderness on the east side of Section 12 of T10S, R20E
- north and east on wilderness boundary to its intersection with road 670569
- south on road 670569 about three miles to its intersection with T670576 (Milpitas Road, a county maintained road)
- east on T670576 about one mile to its intersection with Highway 78
- south on Highway 78 to its intersection with the south boundary of T12S, R19E, the section line on the south side of Section 35
- west along the section line on the south side of Section 35 to its intersection with the boundary of the Chocolate Mountains Aerial Gunnery Range (CMAGR), also coincident with currently designated tortoise critical habitat
- north along the joint CMAGR-critical tortoise habitat boundary to their split, then, with no deviation from current critical tortoise habitat, northwesterly through:
  a. CMAGR

b. Orocopia Wilderness Area
c. (part of) Mecca Hills Wilderness Area to the intersection of Mecca Hills Wilderness Area boundary and the north-south running section line that separates Sections 9 and 10 of T6S, R9E

- north for two miles from the above-noted intersection
- east for one mile along the section line on the north side of Section 3 of T6S, R9E
- north two and one-half miles on the section line that separates the following pairs of sections: 34 and 35, 26 and 27, and 22 and 23 of T5S, R9E, thence to the beginning of DWMA as described above at its intersection with Joshua Tree National Park.

Areas within Large DWMAs in which unspecified navigable washes are designated as open routes

In certain areas of the Chemehuevi and Chuckwalla DWMAs, in the Low Risk-Preferred Alternative, all navigable washes are designated as open routes of travel. This is not the case within Joshua Tree National Park. In other portions of these two DWMAs in this alternative and for all DWMAs in other alternatives this is not the case and washes are designated as open routes or travel only on a specific, wash by wash basis (i.e., same as for routes shown on the routes of travel inventory). See Map 2-10 Appendix A.

Joshua Tree National Park DWMA - There are no area basis designations.

Chemehuevi DWMA. Unspecified navigable washes are designated closed in the DWMA in most locations. In a few areas of DWMA all unspecified navigable washes are designated as open routes. These areas are as follows:

Essex-east of Old Woman Mountains area. Boundary, starting from the intersection of Clipper Mountains Wilderness Area and I-40:

- south on Clipper Mountains Wilderness Area eastern boundary to its intersection with non-route 690126 (also a pipeline)
- east on non-route 690126 (also a pipeline), to its intersection with a section line running between Sections 21-22, 27-28, and 33-34 of T7NR16E; and Sections 3-4 and 9-10 of T6NR16E
- south about 4 miles on above section line to its intersection with road 690200
- southeast on road 690200 to Old Woman Mountains Wilderness Area boundary
- northeast and southeast on wilderness boundary to its intersection with road 690054 (MWD Ward Valley power line service road)
- north on road 690054 to its intersection with road 690228
- west on road 690228 to its intersection with road 690212
- west on road 690212 to its intersection with Piute Mountains Wilderness Area boundary
- west on joint road 690212 and wilderness boundary (past the wilderness gap
- staying on road 690212) to their intersection
- west on wilderness boundary to its intersection with road 690211 (aka Sunflower Springs Road)

- north on joint road 690211 and wilderness boundary to their intersection
- north on wilderness boundary to its intersection with Old National Trails Highway
- northeast on joint highway and wilderness boundary (past the wilderness gap staying on Old National Trails Highway) to their intersection
- north on Old National Trails Highway to its intersection with I-40
- west on I-40 (as described in Item 43 for Chemehuevi DWMA boundary, above) to its intersection with the Clipper Mountains Wilderness Area, thence to the beginning of this designation area

East Ward Valley and East Chemehuevi Valley areas: Boundary, all of DWMA east of road 690056. See Chemehuevi DWMA boundary description, above for more DWMA boundary details.

Savahia Peak area: Boundary, starting from the intersection of Highway 95 and road 690634:

- south on Highway 95 to its intersection with southern boundary of DWMA (road 690742
- east on road 690742 to its intersection with road 690682
- north on road 690682 to its intersection with Whipple Mountains Wilderness Area boundary
- north on wilderness boundary to the intersection of two roads: 690519 and 690634
- west on road 690634 to its intersection with road 690660
- west on road 690660 to its intersection with road 690634
- west on road 690634 to its intersection with Highway 95, thence to the beginning of this designation area

Chuckwalla DWMA

Unspecified navigable washes are designated closed in the DWMA in the following locations:

- Chocolate Mountains Aerial Gunnery Range
- all BLM wilderness areas
- Most of current Chuckwalla ACEC
- north of I-10
- south of I-10 and northwest of Box Canyon Highway

In all other areas of this DWMA unspecified navigable washes are designated open routes.

Small DWMA Boundaries

A. **Joshua Tree National Park DWMA**. DWMA boundary is the park boundary.

B. **Chemehuevi DWMA**. In the northwest part of the DWMA, beginning at the west intersection of Clipper Mountains Wilderness Area and Freeway I-40, DWMA boundary runs as follows:

- south on west wilderness boundary to road 690119 (also a pipeline)
- west about 1.5 miles on inventoried road (690119) to its intersection with non-route 690126 (also a pipeline)
- east on non-route 690126 (also a pipeline) to its intersection with old Route 66
- northeast on old Route 66 to its intersection with Section 31 of T8N, R17E
- north along the west side of Section 31
- east along the north edge of Section 31 to its intersection with old Route 66
- northeast along old Route 66 to it's intersection with the Piute Mountains Wilderness Area
- counterclockwise along the wilderness boundary, across the cherry stem (that divides the wilderness area) gap on road 690212, continuing counterclockwise along the wilderness boundary to its intersection with road 690061
- northeast on road 690061 to its intersection with road 690054
- south on road 690054 to its intersection with the railroad along the north side of Danby Dry Lake (in Section 16, T2N,R18E)
- south on railroad to its intersection with road 690228
- about 1 mile north on road 690228 to its intersection with road 690608
- northeast on road 690608 to its intersection with road 690609
- southeast on road 690609 to its intersection with road 690616
- northeast on road 690616 to its intersection with road 690622
- northeast, then southeast on road 69022 to Turtle Mountains Wilderness Area boundary
- north and west on wilderness boundary to its intersection with the boundary of currently designated tortoise critical habitat

- north, east, then south through wilderness on the critical habitat boundary to the intersection of wilderness boundary
- south on wilderness boundary to the southern-most intersection of wilderness boundary and road 690734
- south on road 690734 to its intersection with road 690609
- northeast on road 690609 to its intersection with U.S. Highway 95
- as road 690609 crosses (to east of) U.S. Highway 95, it changes to road 690742
- east on road 690742 to its intersection with road 690682
- north on road 690682 to its intersection with Whipple Mountains Wilderness Area boundary
- north on wilderness boundary to the intersection of two roads: 690519 and 690634
- north on road 690519 and wilderness boundary to its intersection with road 690510
- 1/10 mile northeast on 690510 to its intersection with road 690056 (also a power line)
- northwest on road 690056 to its intersection with Lake Havasu Road (a paved highway)
- east on Lake Havasu Road to its intersection with Chemehuevi Mountains Wilderness Area boundary
- north on wilderness boundary to its intersection with U.S. Highway 95
- north on wilderness boundary joint with U.S. Highway 95 to its intersection with road 690203 (also a pipeline)
- west on road 690203 to its intersection with road 690261
- 2/10 mile north on 690261 to its intersection with road 690119 (also a pipeline)
- west on road 690119 to its intersection with road 690257
- north on road 690257 to its intersection with road 690102
- north on road 690102 to its intersection with road 690246
- west on road 690246 to its intersection with road 690243
- west on road 690243 to its intersection with road 690056 (also a power line)
- northwest on road 690056 to its intersection with road 690085
- east on road 690085 to its intersection with road 690073
- west then north on road 690073 to its intersection with road 690064
- west on road 690064 to its intersection with Bigelow Cholla Garden Wilderness Area boundary
- north 1/10 mile on wilderness boundary to its intersection with current boundary tortoise critical habitat
- northwest on critical habitat boundary to its intersection with Freeway I-40
- west on I-40 to its intersection with Clipper Mountains Wilderness Area boundary, thence to the beginning of DWMA as described above but circumventing some lands around freeway exits along I-40 as follows (to the south side, only):
  a. at Water Road the NW1/4 of Section 26 and the NE 1/4 of Section 27 of T9N, R19E
  b. at Mountain Springs Pass the NE1/4 of Section 35 and NW1/4 of Section 36 of T9N, R18E
  c. at Fenner the W½ of Section 3 and the E½ of Section 4 of T8N, R17E
  d. at Essex Road the NE1/4 of Section 8 and the NW1/4 of Section 9 of T8N, R16E

C. **Chuckwalla DWMA** In the northwest part of the DWMA, beginning at the intersection of the Joshua Tree National Park boundary and the section line between Sections 22 and 23 in T5S, R9E, DWMA boundary runs as follows:
- east and north on the JTNP boundary to its intersection with road 660327
- east on road 660327 to its intersection with road 660326
- north on road 660326 to its intersection with road 660329
- north on road 660329 to its intersection with road 660334
- northeast on road 660334 to its intersection with road 660332
- south on road 660332 to its intersection with road 660333 (aka Kaiser Road)
- south on road 660333 to its intersection with Highway 177, south on Highway 177 to its intersection with I-10, excluding the following: S½ Section 22, W½ Section 26, and all of Section

27 of T5S, R15E.

- before continuing east on I-10 from its intersection with Highway 177, there are five "cutout" exclusions for freeway exits west of this point (from east to west):
  a. at Eagle Mountain, W½ of Section 29, Section 30, N½ Section 31, NW 1/4 Section 32 of T5S, R15E
  b. at Red Cloud, W½ of Section 6 and the NW1/4 of Section 7 of T6S, R14E and E½ Section 1 and NE1/4 of Section 12 of T6S, R13E
  c. at Hayfield, S½ Section 5 and the N½ Section 8 of T6N, R13E
  d. at Chiriaco Summit, all of Sections 9, 10, and 16
  e. at Box Canyon Highway, all of sections 11, 12, 13, and 14
- (continuing east from item 7, above) east along I-10 to Corn Springs Exist
- east and south of I-10 along the old highway alignment, now named Chuckwalla Road, to its intersection with I-10 at Ford Dry Lake Exit, excluding the SE1/4 of Section 33 and S½ of Section 34 of T6S, R19E
- east along I-10 to its intersection with Wiley Road, excluding the E½ of Section 32 and the W½ of Section 33 of T6S, R20E
- south on Wiley Road to its intersection with road 660159 (aka Bradshaw Trail), excluding (west of Wiley Well Road) the private land of the Chuckwalla Prison area as follows: Section 16, Section 17, the E½ of Section 18, the NE 1/4 of the NW 1/4 of Section 18, and the W½ of NE 1/4 of Section 20
- west on road 660159 (aka Bradshaw Trail) to its intersection with road 660594
- east on road 660594 to its intersection with road 660588
- north on road 660588 to its terminus.
- north on a straight line (not possible to define on the ground) to the south terminus of road 660576 located about one half mile southeast of Chuckwalla Spring. This undefined connecting line is about 1.5 miles in length.
- north on road 660576 to its intersection with road 660581
- north on road 660581 to its intersection with road 660469
- west on road 660469 to its intersection with road 660159 (aka Bradshaw Trail)
- southeast on road 660159 to its intersection with the boundary of the Chocolate Mountains Aerial Gunnery Range (CMAGR)
- clockwise on the CMAGR boundary to its intersection with currently designated tortoise critical habitat
- northwest on critical tortoise habitat boundary through:
  a. CMAGR
  b. Orocopia Wilderness Area
  c. (part of) Mecca Hills Wilderness Area to the intersection of Mecca Hills Wilderness Area boundary and the north-south running section line that separates Sections 9 and 10 of T6S, R9E
- north for two miles from the above-noted intersection
- east for one mile along the section line on the north side of Section 3 of T6S, R9E
- north two and one-half miles on the section line that separates the following pairs of sections: 34 and 35, 26 and 27, and 22 and 23 of T5S, R9E, thence to the beginning of DWMA as described above at its intersection with Joshua Tree National Park.